



FRIDAY, APRIL 11.

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Contributions.

Ventilation or Refrigeration.

CHICAGO, April 3, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Referring to the article of R. M. Pancoast in your issue of March 28. While that writer's views were well "ventilated" in your issue of March 21, and knowing your space is too valuable for a long article, some of the absurdities of his position will doubtless occur to you as follows:

He says, "Does not everybody know that the heat, sweat, etc., are removed by ventilation?" My answer is that it all depends upon the temperature of the air admitted into the car or apartment to be ventilated, and that the temperature of this air is constantly changing, and its effect on the fruit carried will vary every six hours of the twenty-four. For example, the thermal record gives Washington, D. C., 28th of last month, thermometer, minimum 50 degrees, maximum 70. Within two days the thermometer was 24 degrees or below at Jacksonville. Some stations in Florida reported 17 degrees. A temperature of 50 degrees maintained the entire distance from Jacksonville to Washington or Philadelphia, of the air that was entering the ventilated car, would be very satisfactory. A temperature of 24 would not be satisfactory. I take from the thermal record, New Orleans, March 27, minimum 72; on the 28th, minimum 40 degrees.

If Mr. Pancoast's air that entered his car was anywhere near a uniform temperature, it could be depended upon to do certain things. As it varies in temperature according to the outside conditions of heat or cold, moisture and dryness, no dependence can be placed upon it. For example, only twice this winter have shipments of oranges from Jacksonville to Chicago needed the protection of a refrigerator car on account of the cold. Three years ago, for two long months, no ventilated cars were used in this business. To expect next season's business shall be done in the same kind of a ventilated car that this season might have "passed muster," and to prepare ventilated cars for such shipments, would be very risky on the part of any railroad company or transportation line, and this is the very reason that these companies are increasing their equipment of refrigerator cars. I might as well regulate the clothing I wear in Chicago by the thermal record published each morning at Galveston or New Orleans, as to expect a car that was suitable in March would produce the same results in July, while, on the other hand, in refrigerator cars the same temperature can be maintained with the fruit, whether it be January or August, and whether the distance be 500 miles or 3,000.

Mr. Pancoast refers to some oranges in your office. Please say whether their keeping qualities was on account of their successful transportation, or that you were obliged to ventilate them? If your office was as hot last winter as it often is when I call upon you, it was anything but ventilation that kept them. Had their transportation been in the least imperfect, the temperature at which your stationery supply room is kept would have melted them in short order.

Mr. Pancoast cannot secure an even temperature by ventilation. No one has ever been able to do it, and it is only by refrigeration that it can be done.

CHAS. F. PIERCE.

The Intercepting Valve.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Here is a nut to crack for some of your readers who are interested in compound locomotives.

I have been watching such an engine start trains on the Michigan Central, and I find that almost invariably the tarring, or intercepting, valve closes before a half revolution is made by the drivers. Always it closes before a full revolution is made, and long before the slack in the train is taken up. Now, the purpose of an intercepting valve is to increase the power of the locomotive in starting trains, as I understand it. If this be true, what use is it unless it is operating at the time the power is needed, and when is the power more needed than when the full slack of the train is taken up and all cars are being started? The use of an intercepting valve on a passenger engine with a close-coupled vestibule train appeals to me right away; but on a freight train, where the slack between couplings of only fifteen or twenty cars is quite sufficient to permit the locomotive to advance far enough to close the intercepting valve, I cannot see its advantage. I wish you would refer this to some of your readers who are interested in this subject and who are looking it up, as I am much interested in the compound locomotive, and do not wish to see it built with an unnecessary piece of apparatus which, so far as my experience goes, the intercepting valve seems to be.

A FRIEND OF THE COMPOUND.

[Messrs. Taite & Carlton, of 63 Queen Victoria street, London, E. C., agents for the Worsell, v. Borries & Lapage system of compound locomotives, have sent us a new circular on starting valves for compound locomotives. From this circular we quote the following:]

If there is no intercepting appliance the pressure of the live steam that is conducted to the low-pressure cylinder to start the large piston, works as a back pressure on the high-pressure piston. Such engines, therefore, have less tractive force for starting than ordinary engines, where both pistons are driven by the full steam pressure. Only for positions of cranks where but one piston is at work the force of both engines is the same at first, but lessens on the compound for the high-pressure piston, as the pressure in the receiver is growing, before the train is sufficiently in motion. Also such engines must have an appliance to release the high-pressure piston from that counter pressure arising when the slide valve of this cylinder happens to have closed the port, so that no steam can enter behind this piston and prevent the counter pressure to drive this piston in a direction opposite to the low-pressure piston. This necessary releasing of the high-pressure piston from counter pressure is different from the intercepting appliances that prevent this live steam given to the low-pressure cylinder from filling up the receiver, and act on the high-pressure piston. Compound engines, with such intercepting appliances, are at least as powerful when starting as ordinary engines, because both pistons act without back pressure, as in ordinary engines.

Perhaps the writer of the circular can answer the questions of "A Friend of the Compound."—EDITOR RAILROAD GAZETTE.]

The Time Convention.

The spring meeting of the General Time Convention was held at the Hotel Brunswick, New York City, on Wednesday, April 9, 86 roads being represented. There are now in the organization 172 companies, operating 124,000 miles. The standard code has been adopted by 93 companies, operating 65,734 miles, an increase of 14 companies and 13,467 miles since the last meeting.

The date fixed for the spring change of time-table is May 11. The Committee on Safety Appliances, which was appointed at the last meeting to take up the subject of uniform couplers and brakes, interlocking, steam heating and other matters, and which had in its membership, besides some of the best known general managers, Mr. Theodore N. Ely, of the Pennsylvania, was not prepared to report any substantial progress. A brief statement of the three meetings which the committee has held was presented, and the committee is by no means inclined to shirk its responsibility; but the field is so large, and the questions involved in the subjects coming within the scope of the committee's duties are so intricate, that the mere work of preparation and laying out of the ground necessarily involves slow and careful procedure.

The Committee on Car Service has held three meetings, but has done nothing except to send out circulars asking for further statistics of car movement and mileage, and to compile a list of the existing Car Service (demurrage) associations.* The committee has asked for mileage statistics for the six months from Jan. 1, 1890. The whole question of mileage and per diem rates for cars interchanged is laid over, awaiting this information. The number of car service bureaus now in existence is 25, of which 22 have been established during the past six months. The committee reaffirms its belief in the necessity of further reform in the system of settling for interchanged cars.

The Committee on Train Rules made a report embodying some criticisms presented by a member on certain paragraphs of the standard code. The committee decides that these are not of sufficient weight to demand action.

The annual election resulted as follows: President, H. S. Haines, Savannah, Florida & Western; Vice-President, James McCrea, Pennsylvania Lines west of

* The list of car service associations is substantially the same as that printed in the traffic column of this issue. It is more complete, giving the names of managers and other particulars, but not showing statistics of operation.

Pittsburgh; Second Vice-President, H. F. Royce, Chicago, Rock Island & Pacific. Members of Executive Committee: H. Stanley Goodwin, Lehigh Valley; J. G. Metcalfe, Louisville & Nashville. Members of Train Rule Committee: J. T. Harahan, Louisville, New Orleans & Texas; H. Walteers, Atlantic Coast Line; C. H. Chappell, Chicago & Alton.

Col. H. S. Haines, General Manager of the Savannah Florida & Western, who has been President of the Convention for three years, had declined re-election, and his name was omitted from the report of the Nominating Committee; but his closing address, expressing his thanks to the Convention, was so highly appreciated, affording as it did such effective confirmation of the general opinion concerning his eminent fitness for the presidency, that the meeting at once suspended the rules and re-elected him for the fourth year. This address we give substantially in full.

PRESIDENT HAINES' ADDRESS.

This body originated in the necessity for consolidating local time tables to continuous train service. The separate conventions, the Northern and Southern, were so impressed with the inconveniences of local standards of time that they attempted, independently of each other, to establish a uniform standard. In making this attempt the two conventions were led to co-operation with such successful results that they next joined in the establishment of uniform train signals. The next step was to a uniform code of train rules. By this time the advantages of co-operation became so apparent that a move was made toward consolidation, which was effected at Cincinnati in 1886, and the General Time Convention, as thus organized, completed the code of train rules, which is now acknowledged as the standard to which railroad practice must conform. In carrying out these reforms the General Time Convention has developed into a well-organized association, representing the operating departments of most of the railroads in the country.

As a member of the committee originally entrusted with the consolidation of the two conventions, and as the official head of this consolidated convention for the past three years, I have watched its development with interest. I have seen it gradually transformed from a sort of mass meeting for the consideration of time tables into a deliberative body of representative men, gathered together from the length and breadth of the land, skilled in every branch of railroad management; a body with a permanent organization prepared to preserve and carry forward the experiences accumulated from year to year. I recognize the powerful forces inherent in such an organization and the useful purposes which it can fulfil if directed aright.

The General Time Convention has now reached a critical period in its development. Originated, as I have already said, for a minor purpose, it has been engaged in the solution of a few desultory problems that have been presented to it. One after another these problems have been disposed of, until at this meeting there is substantially but one subject before it, that of car service (demurrage). Supposing that subject is disposed of, for what purpose shall the Time Convention exist? Fortunately it has now been directed to a subject perhaps equal in importance to any which has hitherto demanded its attention—that of safety appliances. This is one which certainly contains matter of sufficient moment to maintain our interest in the immediate future of the organization; but shall we not at this point definitely ask ourselves if the time has not arrived to determine whether we shall continue to drift along with each varying current or shall map out a course for ourselves and resolutely pursue it. This association is equal to the consideration of more than one subject at a time; equal, indeed, to as many as may present themselves in its legitimate field of operations. I say "legitimate field" advisedly, for I am of the opinion that it should be restricted to the consideration of subjects in which the members have a common interest. This is true of Standard Time, of Uniform Signals and Train Rules, of Car Service and of Safety Appliances. But those subjects which involve other considerations than those relating solely to railroad practice are outside of its field. For instance, questions of traffic policy, which may arouse individual contentions and competitions between members of the association or between the communities which they serve. Such competitive interests would certainly dominate the discussions in the meetings even though they did not appear to do so. The issues involved in the questions hitherto before us have been mainly due to a difference of opinion capable of adjustment either by argument or by proof. The Time Convention, therefore, should avoid any subject relating to traffic or revenue and should confine itself to matters of operation and economy. The field is large enough to occupy all the time that we can devote to it and includes matters well worthy of our attention.

Assuming, then, that our proper field is that of operation and management as distinguished from traffic and revenue, we have next to consider how these matters should be treated. I should say, as they affect our stockholders, our employees and the public; for we must bear in mind that, as railroad managers, we occupy this three-fold relation. It is in this triple aspect that we have considered the questions that have hitherto been presented here. Treated in this way, there will be no lack of matter for our deliberations. There are improvements in methods and appliances now passing from the experimental stage, in which they are properly the subjects for consideration in technical associations, to the stage in which the managers must decide whether they will recognize them as sufficiently valuable for general adoption. So it has been with the substitution of steel for iron rails, and iron for wooden bridges; with the establishment of sleeping-car lines, with the adoption of continuous air brakes and automatic couplers on passenger trains.

As railroad managers we also handle men as well as material, and here is a field for our efforts as yet scarcely touched in any rational way. A railroad system properly organized has its staff, field and line officers, its supply departments, its inspectors, its divisions and districts of operation; in a word, it is an army, whose office is not to slay or to devastate, but to transport the people and products of a country. To accomplish its functions successfully, discipline is as essential as in a militant organization. With the growth of our business, with the extending area of operations and the increased number and speed of trains, there must be an increased strictness by discipline and an enforcement of that discipline of penalties as irksome to the employé as the incessant

drill and the penal regulations are to the soldier. Resistance to restraint and reproof, a mutinous tendency, a disposition to oppose the interests of the employer in matters indifferent to the employé have been, I fear, encouraged by labor organizations whose ostensible objects are the pecuniary, moral and social welfare of their members. If this spirit is to prevail it will imperil the maintenance of that discipline which is as essential for their own safety as for the protection of the lives of our passengers and the property of our stockholders. The rapid increase of railroad mileage and tonnage has led to the enlistment of a mob of recruits in our industrial army as unused to discipline and to obedience to authority as they are averse to them. In the emergency, railroad managers have been compelled to take this material as it came to their hands and to make of it the best use possible. But as the percentage of new railroad to that which has become more or less settled in its methods of operation, becomes smaller, this necessity will decrease, and we shall then have time at our disposal to drill the disorderly and disaffected members into a proper state of discipline and to dismiss incapables from the ranks. For this work to be successful we must arouse among employés a feeling of pride in the organization to which they belong, of respect to their officers and of interest in the work which they have in hand. This we call *esprit de corps*; a spirit which has carried armies through privation, suffering and defeat to victory, and without which no body of men can be controlled under adverse circumstances. How to do this with the opposition of labor unions better organized than we are is indeed a subject well worth our consideration. It would be out of place for me to do more than to indicate the direction which the discussion of this subject should take; but it surely is one which we have got to face sooner or later, whether we like it or not. I will suggest, however, that as soon as the rapid absorption of outsiders into the railroad ranks shall have ceased, and all questions of wages shall have been approximately adjusted, either by arbitration or by the law of supply and demand, the time will have arrived to determine the relations between railroad corporations and their employés. These relations should be such as will insure the best results of the labor to the employés, to the company and to the public. Here will come in questions as to permanency of employment, insurance against injuries, sickness and old age, priority of promotion, recognition of meritorious services and protection against abuse, on the one hand; and on the other questions of training for special duties, obedience to orders, respect to superiors, etc.

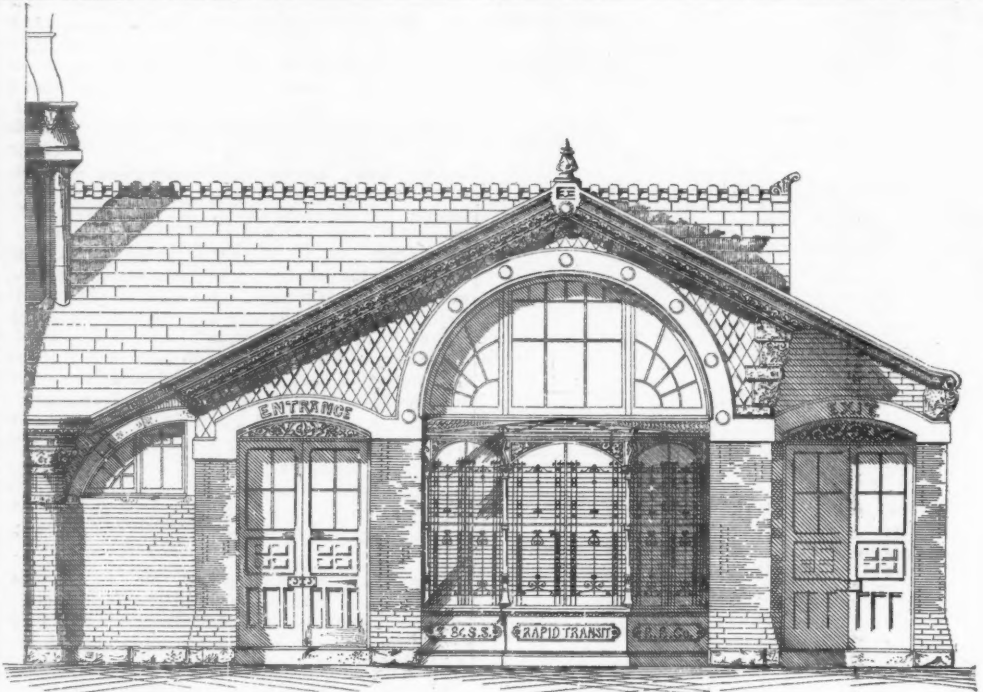
These questions have occupied the attention of military men for thousands of years and have led to the application of certain recognized principles to an army of fighting men that are in many respects as applicable to an army of railroad men.

Our relations to the public are worthy of consideration by the General Time Convention. We are but too unpleasantly aware of the attitude assumed towards railroad companies by the general public. Whatever the causes may have been, whether watered stocks or political demagoguery or discrimination between shippers and communities in the matter of rates, we all know of its existence. We feel it but too sensibly in Federal and state legislation and in municipal ordinances; in litigation, in political speeches, in newspaper abuse. Must this condition of affairs continue? Is it the relation which must of necessity be maintained between the nation, the cities, the people who have been made prosperous by means of railroads to an extent never dreamed of before, and the companies through whose efforts these great results have been obtained? If the triumphs of war have earned for the soldier the applause of his fellow-citizens, the triumphs of peace have at least earned for the railroad man the right to decent treatment at their hands. And I hope and believe that there will be an improvement in this respect with the disappearance of animosity over disputes about matters of traffic and revenue. The great contention as to discrimination in rates is nearing an end, for the margin between the rate and the cost per ton-mile has now narrowed down to a survival of the fittest. The determination on the part of politicians to insure competition has but proved the truth of Stephenson's assertion that where competition is possible combination is probable; the prohibition of pooling has hastened the absorption of the weaker by the stronger corporations, and the time is approaching when one of two solutions of the railroad transportation problem must be attempted—either a government management or a territorial division among private corporations. In no other way can the difference between the rate and the cost per ton-mile be reduced to a minimum, that minimum being the lowest acceptable return upon the capital invested. When that time arrives, the era of the railroad projector, of the manipulator of stocks and of the soliciting agent will have passed away. When that millennium has been attained the railroad manager will still have problems to solve relating to the safety of life and property, to the commodious and speedy transportation of passengers and to the prompt dispatch of freight. In the solution of these, both as related to the public and as relating to our employés and to our stockholders, there is a field for the General Time Convention, and it is to this field that I undertake to direct your attention in expressing my appreciation of the honor conferred on me by electing me three times as president of your association.

Stations of the Chicago & South Side Rapid Transit

Last week we described the standard superstructure of the "Alley" elevated railroad of Chicago. Herewith we show the standard station. The platforms are 200 ft. long and 3 ft. 3 in. above the rail, as shown in figs. 1 and 2. Fig. 1 shows the general appearance of the station from the side. It shows the stairways leading up to the platforms, and the use of a shallow girder at A to give head room. The height of the platform above the street is 23 ft. 11 in. The ascent is made by 39 steps about 7 in. each. Under the station, in fig. 1 at B, will be seen a basement where is placed the steam heating apparatus.

Fig. 2 is a cross section of the platforms, which are 8 ft. wide. The clearance between the outside of the car and the edge of the platform is 3 in. The clearance between the platforms and the houses adjoining is 11 in. The dimensions of the station girders are as follows: Long girders, 4 ft. deep; short girders, 3 ft. 1½ in.; longitudinal girders, 4 ft.; short longitudinals, 11 in., to give head room; transverse girders, 5 ft.



Front Elevation.

GENERAL STATION DESIGN—CHICAGO & SOUTH SIDE RAPID TRANSIT R. R.

Fig. 3 shows a plan of the station and its location with reference to the street. The movement of passengers has been a matter of much study, and several plans have been made and discarded. This last is thought to embody the good points of them all. Passing the entrance, passengers go around the ticket offices indicated at C, thence into the waiting-room, where there are a news stand and toilet rooms for women and men. By the central stairway passengers go to the platform, as indicated by the arrows. They pass the ticket collector who is placed at D, and thence turn in both directions and up by flights of stairs to the platforms, according to the direction in which they

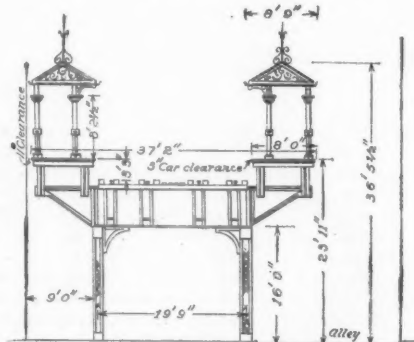


Fig. 2.—Cross Section.

are intending to go. There is only one station for trains moving in both directions. Passengers going south go up on one side, and passengers going north go on the other side after passing the ticket collector and, arriving, pass downward, as shown by the arrows, and out at one exit. Those coming from one platform have a more circuitous route to follow than those from the other; but the design of the station is changed to suit different points of the road, so that, so far as practicable, the platforms having the greatest arriving traffic communicate directly with the straight-a-way exit.

One of the advantages of this station is that only one ticket collector is required. The position of the ticket collector is such that he can see all points of the stairways. The doors of the exits are so arranged that they will open outwardly, but cannot be opened inwardly. If, however, a person should find entrance through the exit, he would be stopped by the iron grille located at E, which is moved by the ticket collector on the arrival of trains.

The general appearance of the station is shown by fig. 4. It is of brick and stone, placed underneath the roadway, as shown in fig. 1. This structure has a tile or dark slate roof. It is built of two colors of brick in the side walls, with terra cotta facings in the gable, of light yellow. The foundation is of stone, as indicated, as well as the corners and quoins stones. The trimmings are of No. 20 galvanized iron. The chimneys and ridge tiles are of terra cotta. A iron grille is placed over the cashier's window. These stations are made right and left hand, to suit the different localities.

The Pittsburgh, Fort Wayne & Chicago Shops.

The headquarters of the mechanical department of the Pittsburgh, Fort Wayne & Chicago are at Fort Wayne, Ind., about five hours' ride from Chicago. The office of

Mr. F. D. Casanave, Superintendent of Motive Power, is on the second floor of the three-story brick building, in which are the drawing room and all the offices of the mechanical department at this point. The building is well lighted and has a particularly pleasant interior. The drawing room, which has just been refitted, is generally well arranged. In one end is an office for the chief draughtsman. This department is supplied with a good reference library and well-fitted blue-printing room. Four draughtsmen are employed, in addition to the chief draughtsman, upon new work which is constantly arising, as might be expected on a progressive road, which acts as one of the most important feeders to the Pennsylvania.

The machine and erecting shop are in one building, lighted from overhead as well as from the sides. Recently the roof lights have been changed from the centre of the roof to the side, in order to give a better distribution of light.

The machine shop tools are nearly all modern. The planers are quick return and of heavy pattern. These tools are arranged on one side of the shop, while on the other are laid parallel tracks, each with a capacity for one engine for erection and repairs. The capacity of this shop, with the ordinary working force, is three "class S" engines per month in addition to repairs.

The boiler shop, while sufficiently large, is not yet fitted with modern tools. The riveting is still done by hand, although the smaller tools are of modern kind, such, for instance, as the tapping machine for screw stays, driven with flexible shaft. One notices a substantial pair of rolls among the tools, and also most excellent flanging done by hand. The work is, in fact, such as would be creditable to a hydraulic flanger.

The blacksmith shop, which is very well arranged, contains a large number of fires, having peculiar but efficient hoods, and several novel tools, as well as a good supply of common tools and steam hammers. This shop is almost entirely free from smoke. There is a scrapping furnace and hammer which also answers for forging and welding on frame legs. Here will be found what is known in blacksmith shop vernacular as a "bulldozer," which is made useful for a variety of purposes to which it is not ordinarily put. Besides performing the ordinary bending operation for all manner of truck frames, brake levers, body bolsters, transoms, etc., it is used for forming many small parts of various shapes of material, from parts weighing less than one pound to pieces of considerable weight. Where practicable the designs of small parts have been changed so that they can be formed upon this machine, which, with its large number of dies of ingenious form, plays an important part in this shop, as it should in all forging shops where there is a reasonable amount of duplicate work. Just outside of the blacksmith shop is located a crane of new design built of iron channels, which sweeps around a circle in which are placed the dies for the shop, which are, by means of this crane, readily handled and placed upon trucks to be transported where needed.

The truck shop has a capacity of 20 completed trucks per day of the standard Pennsylvania iron bolster, rigid centre type. Among the tools, all of which are modern, are three good wheel borers and a centre-driven double header axle lathe.

The wood-working shop has been recently rearranged so that all work passes through the shop without interfering with tools in operation, or with other work in progress of construction. This shop has a capacity of 10 cars

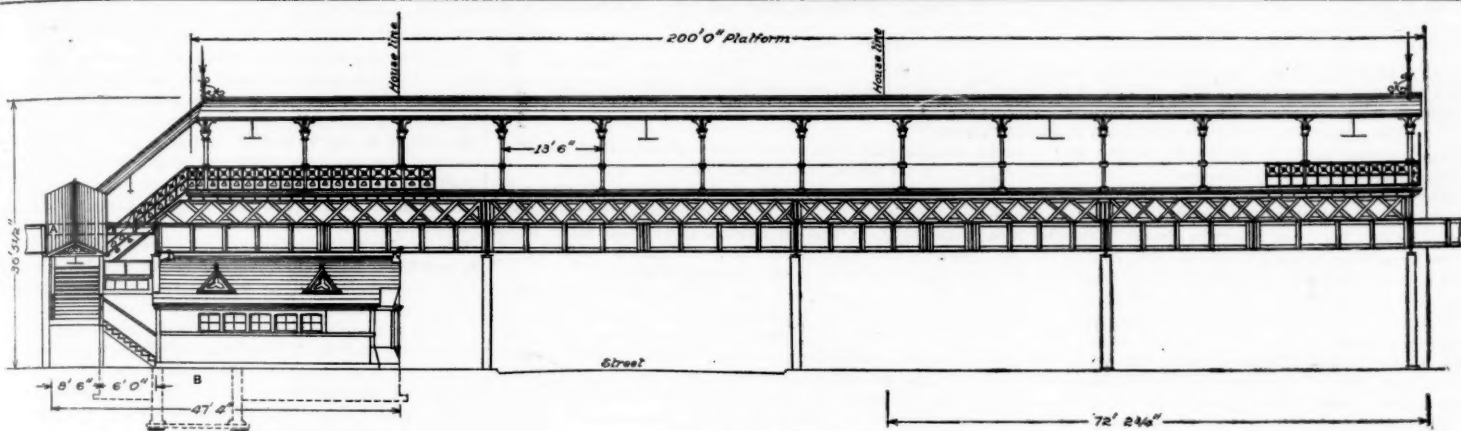


Fig. 1.—Side Elevation.

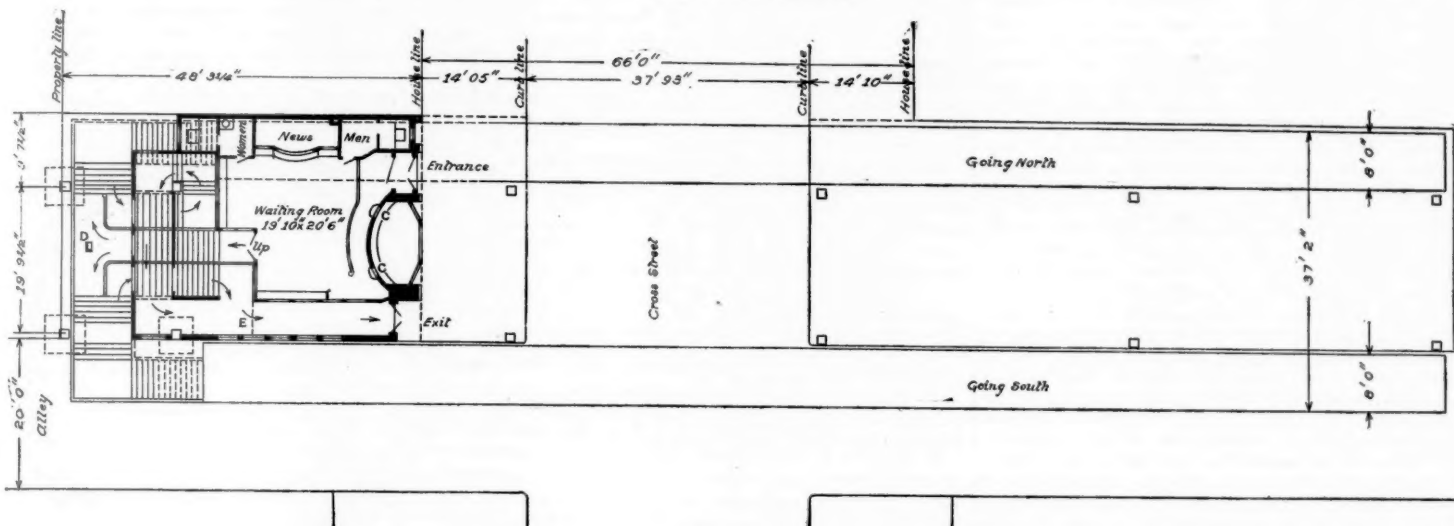


Fig. 3.—Plan.

GENERAL STATION DESIGN—CHICAGO & SOUTH SIDE RAPID TRANSIT R. R.

daily under ordinary conditions. It is heated by air driven into the building by fans. The shavings are taken away by an exhaustor and driven to the boilers, the excess being sent to a shaving tower, from which they are taken for local consumption about the city. The erecting shop for cars is about one mile away, and from the wood-working shop the prepared material is transported upon flats. A convenient method of getting out siding for cars, and arrangement of trucks for carrying it, can here be seen in operation.

Convenient wash rooms for the workmen are arranged in every department. The arrangement in the engine sheds is particularly commendable, because it gives each man an independent wash basin, and does not compel him to average up the amount of grime which he has collected with his fellow-workmen, who may have collected more or less than he, as the custom was in all shops a few years since. The basins here referred to as being independent are inexpensive, made simply of good XXX tin, hinged so as to be kept in proper position, and emptied by lifting up the outer edge to a vertical position, where it is held by a spring catch.

Changes and improvements are continually in progress at these shops. Throughout one cannot help noticing the effect of good management and excellent system. The piece-work system prevails. It is seldom that one sees a perfectly clean shop with the small tools in their proper places and the floors free from old junk; but it can be seen here, and reflects much credit on the management.

Universal Unlocking Device for Car Couplers.

The introduction of different designs of the automatic vertical plane car coupler has necessitated the use of an unlocking gear that will be applicable to all or nearly all of the different designs of couplers. Otherwise when a coupler is disabled, and it is desired to replace it by another of similar type but differing in the location of the locking pin, more or less extensive alterations in the unlocking devices will be necessary. To meet this point, and to save time and expense in the substitution of one drawbar for another, the design of unlocking gear shown herewith has been devised by the New York, Lake Erie & Western for use with the Janney and with the Gould car couplers. Fig. 1 shows the device as connected with the Janney, and fig. 2 as attached to the Gould. In fig. 3 there is shown the double cam that permits the use of the device on two car couplers having different locations of pins and different amounts of lift of the pin before reaching the unlocking position. When the cam A is used the lift is $3\frac{1}{4}$ in., and the centre of the cam is 3 ins. from the centre of the car corresponding to the location of the locking pin of the Janney coupler. When cam B is used the lift is shorter

and that cam is at the centre of the car, and thus corresponds to the lift and location of the lock of the Gould.

The device consists of a shaft about 44 in. long, with a $12\frac{1}{2}$ -in. crank at one end and forged square at the other, as shown in fig. 5. This shaft is mounted in brackets on the front of the car, as shown; one bracket being on the end of the car, the other on the buffing block. On this shaft is placed the cam shown in fig. 3, which has a square hole to fit the shaft. Attached to the car by a hinged joint is the lifting lever, fig. 4, in such a position that its under side at C rests upon either the cam A or B, according to the location or lift required.

As the shaft is rotated the cams raise the lever, and the chain attached to its end lifts the locking pin, as can be clearly seen from figs. 1 and 2. The cam is so shaped that when the shaft is rotated until the crank is at the highest point, that is, diametrically opposite to that shown in the illustrations, the shaft will remain in that position—which is the unlocked position—in spite of jars and shocks. This is necessary when shifting cars in yards, when it is desirable to have the couplers remain unlocked. Owing to the power of the cams, there is no

difficulty in unlocking the couplers with this device while the engine is pulling out.

This arrangement is now in use on several thousand cars, and has been found to be operative and in good order after severe usage. It is made by the Dayton Malleable Iron Co., Dayton, O.

The Wilmerding Shops of the Westinghouse Air Brake Co.

The Westinghouse Air Brake Co.'s new shops at Wilmerding, Pa., about 25 minutes' ride from Pittsburgh, are rapidly nearing completion, and they will probably be the best equipped shops for manufacturing light special work in this country. From the foundry to the finishing and testing department every attention has been paid to the reduction of cost of labor and to the increase of output per tool and per square foot of floor space. The buildings are all of brick, and bear the names of the different departments on the front wall in light-colored brick, which contrasts with the red brick, of which the buildings are constructed. The roof trusses

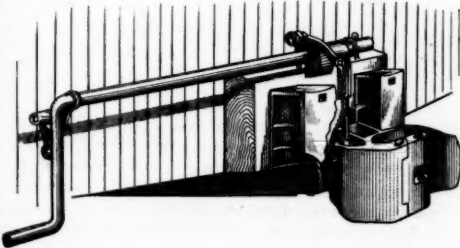


Fig. 1.

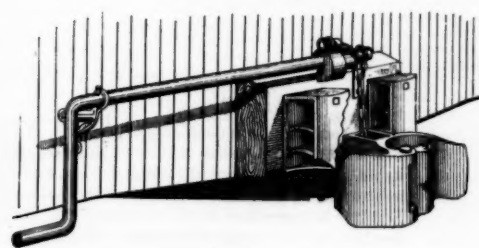


Fig. 2.

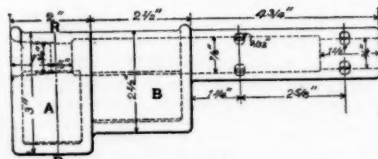


Fig. 3.

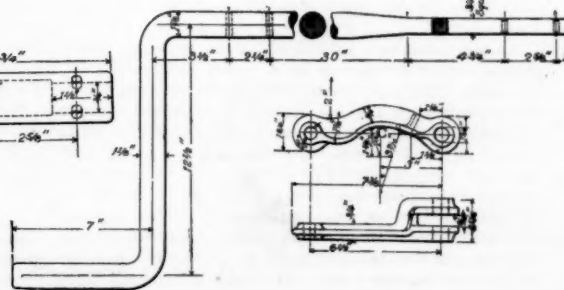


Fig. 5.

Fig. 4.

UNLOCKING DEVICE FOR M. C. B. COUPLERS.

NEW YORK, LAKE ERIE & WESTERN RAILROAD.

are of a peculiar design, by the Keystone Bridge Co. They are formed of angles and flats, and are of light and handsome appearance.

The shops are situated between high hills, in a valley through which flows a small river on its way to the Ohio. On a slight rise or tableland in the same valley, and extending up on the hillside, lies the village of Wilmerding, which is being rapidly built by the Westinghouse Co. for homes for its employes on the plan given in outline in the *Railroad Gazette*, March 14, 1890. The few old houses formerly there have either been torn down or remodeled, and a new station on the Pennsylvania Railroad is to be erected. Thorough systems of water supply, fuel-gas supply and drainage are under construction. The most striking structure on the hillside is the new library and gymnasium building, built of light-colored stone, and furnished with complete sets of gymnastic apparatus, and including a large swimming bath.

At the entrance to the works stands the superintendent's office, a moderate sized brick building of artistic design, with rooms for the officers and draughtsmen, as well as time-keepers and clerks. On the right, on entering the yards, is the iron foundry, an immense building under one roof, finely lighted, and containing facilities for casting 500 sets of freight-car air-brake equipment per day. Several new schemes for facilitating the work are to be put into operation here. The most interesting of these is probably the traveling table, which carries the completed molds to the pouring floor opposite the cupolas. The plan of the operation of this table is as follows: On one side of the table, which is endless, each platten finally returning to the point from which it started, are arranged eight molding machines, that is, four pairs, each of which forms one-half of the mold. These molds as soon as formed are placed together and put upon the traveling table, and pass to the pouring floor, where they are filled, thence on the same table in the same position to the cleaning floor, where they are taken apart, the castings placed in ratters and the table cleaned before again reaching the molding machine. The table consists of cast iron plates mounted on wheels which travel on a track laid in the floor, and so arranged that they can freely pass around a vertical drum driven by a stationary engine at one end of the line of travel. At the other end the tables pass around a similar drum and return. The height of the table from the floor is about 2 ft. 3 in. Its construction is most ingenious, and the whole plan one that cannot fail to attract the attention of iron founders all over the world. The distance between the drums, which is about one-half the total length of the table, is not far from 200 ft. There are

room, where castings are knocked out of the mold, delivered to the ratters and then chipped, after which they are placed on flat cars and carried to the machine shop.

At this end of the foundry an inclined railroad extends from a switch-back in the yard tracks up to the charging floor of the cupola. In this manner all the iron, coke and coal is delivered directly from the cars to the charging floor, and all cinders and refuse, after being blown into a pit outside the foundry, are raised by elevators to the cars on the inclined railroad.

Next to the foundry is the blacksmith shop, which in construction and dimensions is not greatly different from the foundry. Here also is located the brass foundry, now in operation, but the blacksmith shop has yet to be fitted up. Next to these shops is the boiler house, in which are several Babcock & Wilcox boilers, and here will be a large compound Westinghouse engine, which is to drive an enormous ventilating and heating fan built by Gardiner C. Hawkins, of Boston. This fan furnishes the necessary air for the foundry and blacksmith shop. From the boiler house there extends to the machine shop a large underground tunnel through which will be carried all the piping necessary to connect the buildings. This tunnel is large enough to permit workmen to pass through and examine the piping whenever necessary.

The tracks from this line of buildings extend to a turn-table in front of the machine shop, thence to the Pennsylvania Railroad on a spur track. By means of this turn-table the material from the foundries and blacksmith shops and from the railroad is delivered directly into the machine shop, on full-sized cars, and these cars can pass directly through the store room, which is in the centre of the machine shop, and is well lighted from above by roof lights. From all sides the completed equipment is delivered to the storing floor, where it is placed in the proper cars ready for shipment.

The machine shop has two floors with an open space in the second floor on the centre line. It might be said that the second floor forms a wide gallery around the interior of the shop. On the lower floor will be constructed all of the heavier parts, such as cylinders and air reservoirs, by special machinery, much of which is already being put into position. Among the interesting special tools on this floor are the new cylinder borers and multiple drilling machines for the ends of the cylinders. On the second floor the smaller parts are made, and a great number of machines is ready to be placed in position. Among the new tools here are the triple valve cylinder grinders, which have been developed, after a large amount of experiment by Brown & Sharpe Mfg. Co.

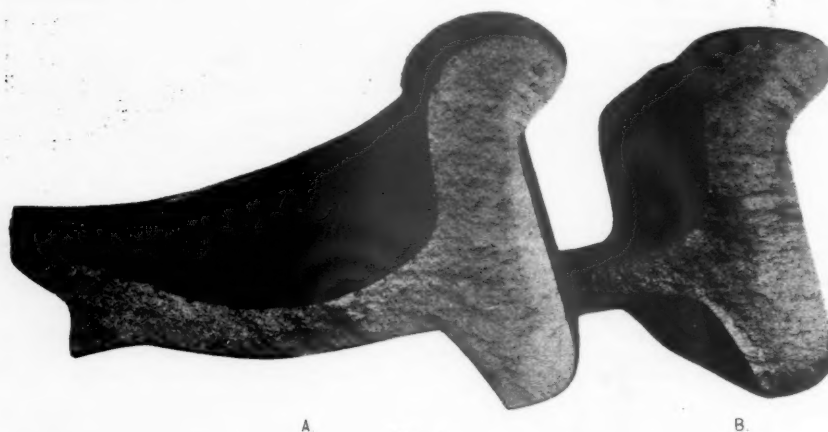


Fig. 1.
Wheels Cast in Ordinary and in Non-expanding Chills.

two of these tables, one on each side of two sets of cupolas, which are arranged in the middle of the building.

The molding machines are of Scotch design, and have attracted attention heretofore. Their principal feature is the rapidity of operation, which is something marvelous. One blow of the hydraulic ram is sufficient to completely mold and ram up a pattern. The blow, being almost instantaneous, is quite in contrast with the slow-acting pneumatic and hydraulic machines heretofore used.

The vertical drums around which the molding tables pass in transit are driven by a worm and worm gear, the worm being attached to a jack shaft, which is driven by wire ropes from a high-speed Westinghouse single expansion engine mounted on an intermediate floor in one end of the structure. The furnaces are of the Colliat type, and are blown by a Sturtevant blower mounted on the intermediate floor just referred to. It is driven by a second Westinghouse engine of the same type as that which drives the molding table. Near the molding machines, in such position as to be readily reached, are the core ovens, which are well worth attention. They are made by Eli Millett, of Springfield, Mass., and are so arranged as to dry a maximum number of cores in a minimum of space. While not being at all conspicuous, and of small dimensions, they are of sufficient capacity to supply the cores for 500 sets of brakes per day.

In the end of the foundry opposite to that where the molding machines are located is a cleaning and ratter

product is now made in it. Their wheels get a more uniform chill, particularly near the throat, than in the ordinary chill, and give a much longer mileage. The difference in the depth and uniformity of chill is well illustrated in fig 1, in which A is a piece of a wheel made in the ordinary chill, and B of one made in the Hollister chill.

The wheels cast in this chill are free from the ridges on the tread which are left by the sectional chill. It is claimed also that the iron can be poured as hot as it can be got from the cupola. The advantages of hot pouring have been made familiar by recent discussions on the use of "contracting" chills.

Fig. 2 is a section in plan section of the Hollister chill taken on A B of fig. 3. Fig. 3 is a vertical section taken on C D of fig. 2, showing also the position of a wheel in the chill. The essential feature of this chill is the pipe or channel E, $\frac{3}{4}$ in. in diameter, making the entire circuit of the chiller, very near the throat of the wheel tread. In casting, a stream of water is passed through this pipe under pressure so as to secure a rapid and constant flow, and keep the metal of the chiller cool. Steam has been passed through this pipe to expand the chiller before pouring, but it is not decided that there is any advantage in this.

Of course the theory of the non-expanding or the

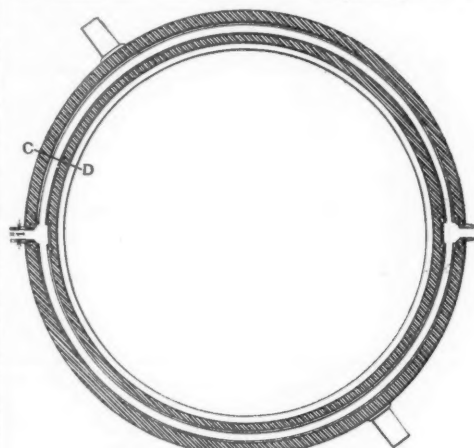


Fig. 2

contracting chill is well known. It is to keep the chilling medium in contact with the tread of the wheel while it is cooling. This can only be done by preventing the expansion of the chill by the heat of the metal, or still further, by the chilling surface following the wheel as it cools and contracts. In the chiller shown, the aim has been especially to keep it cool where the chill is often lightest, and where it is most important, at the

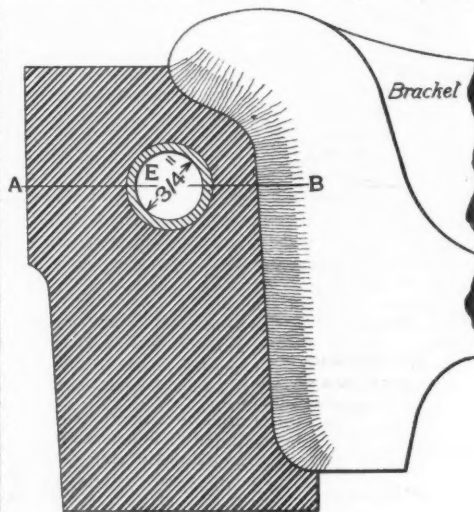


Fig. 3.

throat of the wheel. At the same time, it is said that by the position of the pipe and the distribution of the metal of the chiller this is kept from bursting, as a result of rapid irregular expansion, which has heretofore been a difficulty with chills of this class.

Fire in the Hudson River Tunnel.

The exact cause of the fire which occurred a few days since in the caisson at the New York end of the tunnel is not known. In order to stop the fire it was necessary to flood the work, and the air was therefore allowed to escape as soon as the men had all reached the surface. The extent of the damage has not yet been ascertained. At this writing, pumps are at work, and it is more than probable that the roof of the caisson will soon be exposed, when a superficial examination can be made, and the joints uncovered at the foot of the well-hole can be caulked.

It is evident to all those who are familiar with the action of fire when it attacks timber placed under compressed air, and arranged in such a structure as this caisson, that it is impossible to estimate, before thor

The Hollister Non-Expanding Chill.

Much public discussion has taught us that the doctors do not agree as to whether or not a chill does contract; therefore, while the Barr and the Whitney chills are called contracting, the Ramapo people prefer to call the one shown here the non-expanding chill. They feel sure that it does not expand, whether or not the others contract. So long as they get the results, we will not quarrel about terms, and evidently they do get the results. The Hollister chill has been used by the Ramapo Wheel & Foundry Co. for 20 months, and nearly all of their

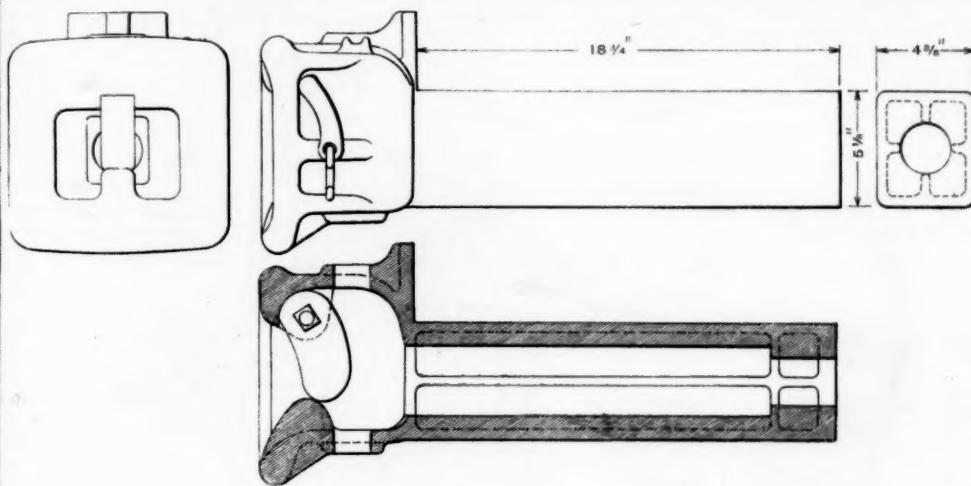
ough inspection, the full extent of the damage done. The reason is a simple one: The outgoing currents of air escaping through the many exceedingly small passages, which are always present in a caisson built of wood, and which the most careful construction cannot wholly avoid, may lead the flame far away from its source and the timber may be more or less completely destroyed at a considerable distance from the fire's starting point. This fact was illustrated in the fire in the caisson of the Brooklyn Bridge, where, from an apparently insignificant beginning, it extended vertically through many courses of 1-ft. thick timbers and covered a horizontal area of many feet. The action in this case may be similar, but, as stated, it will not be definitely known until after complete inspection.

In every characteristic—except the single one that it is an inverted box—the caisson at the New York end differs essentially from that sunk at the Jersey end. The adoption of this method of commencing the work may be said to have been the outcome of the experience gained on the other end by sinking a caisson over the caved-in section after the accident in 1880, and then connecting it with the two tunnels already built. The caisson was thus converted into a large working chamber for the reception and disposal of supplies and excavated material. After the tunnel had been finished for a sufficient distance to permit the building of two bulkheads across it having the necessary air locks, that side wall of the caisson adjoining the shaft was cut through and the air pressure reduced to normal. Both caissons were rectangular in plan, with slightly battered sides to reduce the cling of the earth while they were being sunk; but the New Jersey one was formed inside with an arched ceiling and the triangular spaces thus formed at each end were filled with concrete. This added considerably to the strength of the structure and was in every way far better and cheaper than the flat ceiling of the New York caisson. This is 48 ft. long, 29½ ft. wide and 25 ft. high at the bottom. The sides are 3 ft. thick, and have a batter of ¼ in. to the foot. The walls and roof are built of 1-ft. timbers, the courses extending at right angles to each other. Upon the inside are a sheathing of thick plank and a skin of sheet iron. Extending centrally through the roof of the caisson is a shaft 5 ft. in diameter, and having at its lower end a cross piece 6 ft. in diameter and 15 ft. long. At each end of the cross piece, which with the shaft forms an inverted T, is a 3 × 4 door, and at the lower end of the shaft is a third door. This formed a double-ended air-lock, through the vertical portion of which material and supplies could be passed and finally handled at either end desired. The second shaft was 3 ft. in diameter, and had a door at each end; this was used in getting in timbers, as it would admit long lengths. The third shaft was 5 ft. in diameter, and at its upper end had a horizontal section forming with its shaft a T. Three doors were provided, as in the case of the first shaft. This was used by the men.

When work was resumed a short time since at the New York end, it was found that the caisson leaked more or less, and in order to get at the seams and caulk them the sheet-iron sheathing covering the interior was removed between the central air lock and the shore. The men were then instructed to watch carefully and stop all leaks discovered. This work can be done in one of two ways: A leak of any appreciable size may be detected by the ear, since the out-rushing air makes a noise similar to that of escaping steam, which will readily and invariably inform the watcher of the exact location. The other method is to pass a lighted candle over the surface and note the action of the flame. If the flame is suddenly drawn in it is evidence that the air is escaping and the flame is naturally following the current. The latter method will detect a leak of such insignificance as to make a sound inaudible to the ear. It is probable, though not positively known, that the fire originated from the carelessness of a workman searching for leaks with a candle. Once started it spread rapidly, since even exceedingly damp wood will burn fiercely under compressed air. Before the fire could be stopped it had gained such headway as to necessitate the flooding of the work. This was accomplished and the fire put out, and now the engineers are trying to pump the water out and learn the amount of injury done.

On Wednesday morning last three powerful pumps were at work to lower the water in the well-hole or shaft, with every evidence of success soon being attained. The outer seams will be caulked as soon as the roof can be reached. Should this prove to be sufficiently effective to confine the air, the caisson will be entered, and by means of a raft the burned section of the roof will be examined and repaired. The caisson is located a short distance back from the bulkhead wall of the river, and although imbedded in sand it passed through made ground, mostly cinders, while being sunk. It is more than probable that almost all the water enters the caisson through the tunnel heading, that entering through the leak being small in comparison, though sufficient to tax the power of the pumps now used. Attempts to stop the leak by introducing such material as hay into the caisson, under the impression that the current would carry it to the opening, where it would lodge, have not proved successful.

In the north tunnel, about 30 ft. from the river side of the caisson, is a masonry bulkhead provided with the



THE HUSELTON AUTOMATIC CAR COUPLER.

usual air lock. At the time of the fire, a second bulkhead of similar form was being built about 150 ft. from the caisson. It is the intention, after this has been completed, to remove the air pressure from the caisson, which will then serve as a working chamber, having an open shaft. All this work having been accomplished, the tunnel will be built by the aid a shield like the one now nearly in place in the heading of the north tunnel at the New Jersey end, and which was fully described and illustrated in our issue of March 14.

The old method of building by compressed air and a double iron bulkhead will not be resumed. The shield has been received at the work and will be put in position as soon as possible. It will be remembered that the caisson is entirely surrounded by sand, which slopes gradually toward the river, so that the heading now rests in about half silt (at the top) and half sand. Building the tunnel through this sand is an extremely difficult work, requiring the exercise of extreme caution.

The Huselton Coupler.

For those who wish to use an automatic link-and-pin coupler, the Huselton is evidently a good one. It is simple and cheap, and those who have used it pronounce it durable and efficient. The cuts show it in side elevation, front elevation and vertical longitudinal section. Its simplicity is such that no description is needed. The latch shown in the section is raised by the arm shown in the side elevation which is attached to the shaft carrying the latch; depending to this latch a hook is seen which can be made fast in a notched lug shown near the top of the draw head, thus holding the latch not to couple; the link in pulling rests against the lower end of the latch and against the boss or lug in the mouth of the draw head, and uncoupling is easily effected when the pulling strain is slackened. Any ordinary link is used, and by taking out the latch it becomes a simple link-and-pin coupler.

This coupler is made of malleable iron and in different sizes and can be put on old or new cars without changing existing carriers. The Huselton company says that over 10,000 of these couplers are now in use on different roads, and the letters which accompany the circular issued by the company commend it highly. This coupler is controlled by the Huselton Automatic Car Coupler Co., Pittsburgh, Pa., and is made by the McConway & Torley Co.

Locomotive Boilers.—New England Railroad Club.

The regular monthly meeting was held on Wednesday, April 9. President Richards was in the chair, and announced that the subject for discussion at the May meeting would be the length of rigid wheel base permissible on American railroads. The question, of course, applies to locomotives, tenders and cars.

The subject of the evening was locomotive boilers, and was opened by Mr. H. L. Leach, the Boston agent of the Otis Steel Co., of Cleveland. Mr. Leach said:

In the first locomotive the principles of high pressure, expansion of steam and forced draught were adopted, and the same principles are still in use, although the application of those principles has been greatly improved. In the construction of a boiler—assuming all locomotive boilers to be made of steel—care should be taken in heating the plates for flanging, that the material may not be injured by overheating. If a plate is overheated, it is not safe to be used, as the nature of the plate is changed and consequently weakened, and the plate at that point will be still further weakened by the rivet holes that are to be punched or drilled in the flange. All holes in plates for boilers should be drilled instead of punched, and especially all flanged plates, as they are liable to have been overheated, and if they have not been overheated, the flanging is liable to cause a strain on the plate at that particular part, which the rivet holes and riveting will afterward cause to crack.

It has probably been observed by all boiler makers that cracks occur oftener at rivet holes or edges on a flanged plate than on others. If plates are punched, it is important that the punches and dies be in good condition. If their corners are worn rounding, so that they will not make a good, clean cut, they will weaken the plate. A punch or die should be in such condition that little or no

depression can be observed around the rivet holes. Punches and dies are sometimes used when in such poor condition that the plates have to be laid on an anvil and a sledge used to straighten up the depressions made by the poor tools. Again, when the die and punch are in poor condition, a burr is left on the under side of the hole that has to be reamed or drifted away. A rivet hole in a boiler plate should never be enlarged by a drift pin. The manner of making the seam is important. It has been customary to reinforce longitudinal seams by adding a welt. This is absolutely necessary in order to strengthen the boiler at that point as well as to prevent corrugation, which is liable to occur at the edge of a double riveted seam when not so reinforced. Thorough annealing of all the plates is important, especially those that are flanged. Even this will not always relieve the flange of all strain on the fibres of the material, especially in the case of throat plates, which are subject to more manipulation than the others. Probably the most cracks occur in throat plates on account of the strain caused by flanging, and also because it is subject to more strain from its position in the boiler. Mr. Leach then illustrated by a drawing his theory that the expansibility of the top and the rigidity of the bottom in the first sheet in the cylinder over the fire box was the cause of many explosions.

A common practice in boiler construction has been the making of the back in three plates; one on each side extending up to the circular part, and the other making the crown. This crown plate is tied to the crown bars of the fire box, and the side plates are stayed to the side plates of the inside fire box. The fire box is subject to extreme heat, and, consequently, great expansion and contraction. The fire box plates are carried up by expansion, forcing the crown up, and with it the crown bars; and by the crown bar stays, the outer crown plate is forced out of shape, while the lower side plates are nearly in the same condition that they were when the boiler was cold. As the seams in the circle are rigid, owing to their being double, they cannot conform to the enlarged circle, or to the form the plate would take if the seam was not there. The result is that a sharp bend is made at the edge of the seam, and although the bend is slight, the constant repetition of this strain results in furrowing or grooving the plate; and the dangerous point cannot be got at to be examined. When the flues are out of the boiler, all of the other seams can be got at and examined, and if furrowing has taken place it can be discovered and repaired; but this particular seam is inaccessible without taking out the firebox, making an expense nearly equal to making an entirely new boiler, so that any master mechanic is justified in throwing away a boiler that he has reason to suspect has these seams grooved on the edges.

It is becoming the general practice to make the whole of the back end in one plate, and I think a boiler should be made in no other way. The rolling mills of the country are now able to make plates of almost any dimensions, and boiler makers have facilities for handling them. Some say it is less work to make the back end in one plate, so there is no excuse for continuing the old and more dangerous method.

The throat plate should have as large a circle as possible; the water space in the front of the firebox should be ample to admit a large and easy flow of water, and the flues should not be too near the shell. The greatest heat and consequently the most rapid flow of water in the cylinder part of the boiler is in and around the flues nearest the centre, and as that flow must be upwards, a space should be left somewhere for the water to descend, and that at the coolest part. It is impossible for the water to descend around the firebox on account of the rapid up-flow there, and as the outside of the cylinder is naturally the coolest place, plenty of space should be left there for the down-flow. I know it is held by some that when a locomotive boiler is in use, and the engine working, there is no down-flow of water which has once risen; that all the water is used up in steam, and is replaced by new water; so that when the water has once risen it is all used up in steam. That may be the case when the engine is actually working, and the water supply is constant, and just enough to keep the water in the boiler at the proper height, but this is not the case at all times. In my opinion the obstruction to the downward flow is the cause of many explosions of locomotive boilers. I am fully convinced that the upward rush of water is so great that the flues are sometimes left bare, because enough water could not get down to replace that which was forced up. The bare flues are overheated, and when the water again comes in contact with them it causes a great and sudden increase of pressure, then if the boiler has a weak spot it gives way.

The question is often asked, At what age should a locomotive boiler be condemned? In answer to that I have only to say that the safety of a boiler does not depend so much upon its age as upon the material of which it is constructed. Our locomotive boilers were formerly constructed wholly of iron, and the substitution of steel was a great innovation. It has been found that steel has more of the qualities that go to fulfill the requirements of a good boiler than iron. There are iron

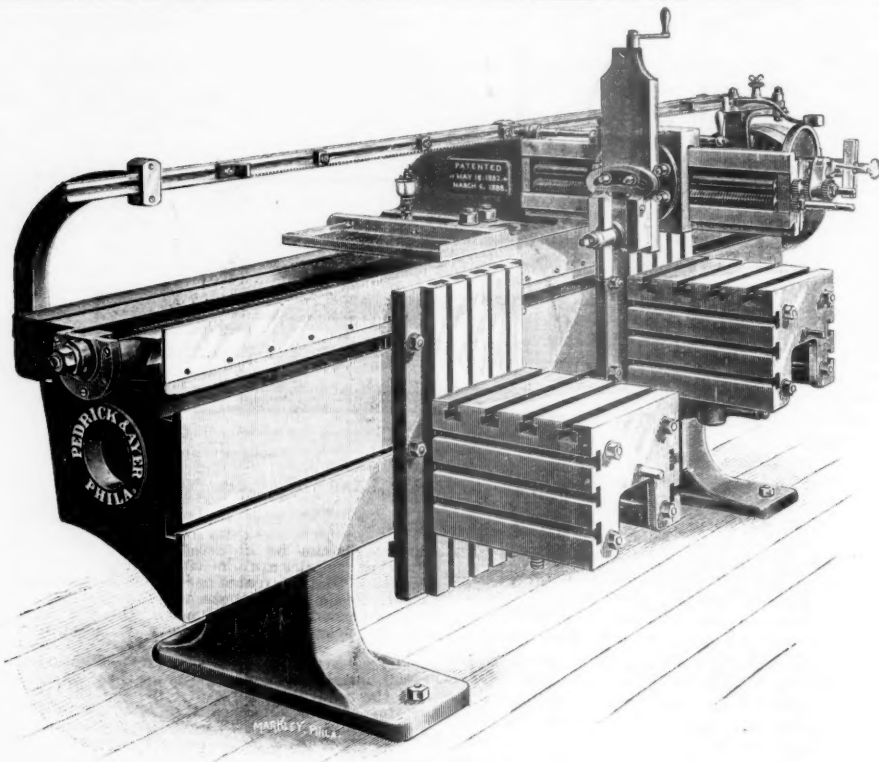


Fig. 1.

RICHARDS' OPEN SIDE PLANER AND SHAPER.

Made by MESSRS. PEDRICK & AYER, Philadelphia, Pa.

boilers in use to-day on some of our New England roads that are more than 30 years old, and are good boilers yet. The first boiler built for a locomotive by Hinckley more than 50 years ago was cut up only four or five years ago, and then not because of its age nor because it was defective. There are other locomotives which are less than a dozen years old having iron boilers which are hardly safe to be used.

Mr. LAUDER: I was much struck with the sensibleness of Mr. Leach's views, especially that the outside crown sheet should never be made in more than one piece. The old practice of two sets of sheets and a crown riveted on both sides is villainous; it invites disaster. With the higher pressures now common come higher temperatures, so that we get strains not only from the pressure, but we get it also from a greater difference in the temperature. The outside crown can just as well be made of one plate and be made very much cheaper. It does not cost as much to fit that plate as it does to put it on in three pieces. I now make the cylinder part of the boiler in one sheet, so that practically the outside shell of the boiler is composed of very few pieces. I have been charged, perhaps justly, with being a little cranky on the question of mud-rings. I have been advocating for a good many years a better form of construction in the bottom of the furnace, but I have had such remarkable success with the double riveted mud ring that I cannot refrain from saying in public that anybody to-day who does not use it in locomotive boilers is in the position that some of our good friends the editors regard New England as being on the coupler question. Of course it will cost a little money to double the depth of the mud ring and put in two rows of rivets, but the end amply justifies the means. I have used that form of construction for ten years exclusively, and in no instance have I known of a drop of water to come from the mud ring of a boiler made in that way. Of course I should not expect any form of construction to stand that length of time without leaking in the West, where the water is not so pure, but I am confident that with more care in the

construction of the bottom of the furnaces the vexatious delays from leaky mud rings will be cured and will be mitigated even in the West. If I were building boilers for some roads in the West, where the water is extremely bad, I should probably adopt the Belpaire pattern.

In answer to a question Mr. Lauder said: Our double-riveted mud ring is 4-in. deep. The old-fashioned one is 2½ in. A ring is ordinarily 2 in. deep, and the two sheets are held to the ring with a single row of ¾-in. rivets. Locomotive builders, where they are building boilers to sell, in order to save a dollar will sometimes bend the mud ring around the corners without upsetting it. The result is that with a 2-in. ring the outer edge will scarcely measure enough to cut a ¾-in. hole through it and have anything left for cracking. No reputable maker would do that, but it is done by some builders to-day. These things can only be corrected by a thorough and rigid system of inspection, and even then sometimes they will manage to get a start of the inspector and work in a good deal of poor work. There is another thing that a great many builders do simply to save a few dollars, and that is the use of their vicious system of longitudinal staying. Instead of running stays from the back head to the front flue sheet, having them draw straight on each head and tying the heads together firmly, they will run the stays from the back

head to the shell of the boiler and rivet them on to the shell. Then they will run stays from the front flue sheet back and rivet them also to the top of the shell. That system I regard a dangerous one. When the boiler is put under pressure, the pressure on the back head will, it seems to me, draw down and throw out of place the shell of the boiler where the stays are riveted. I believe that the heads should be tied together. Within five years, and probably within two, it will be nothing unusual to see locomotives carrying 200 lbs. pressure. Even if the compound locomotive proves a failure and we continue to use the plain high-pressure engine, I believe that at least 200 lbs. will be found to be an economical pressure. We are constantly called on for harder service. They want us to pull our trains at a higher speed, and the trains are of greater weight. The passenger locomotive is getting to be about as heavy as it should go and the problem is how to get more out of the present weight of locomotives. A boiler that carries such terrific pressure as 200 lbs. to the square inch must be very carefully designed, the workmanship of the very best and the material carefully selected.

The Richards Open-Side Planer and Shaper.

Since securing the rights of manufacture and sale of the machine-shop tool shown here, Messrs. Pedrick & Ayer have designed the machine with special reference to railroad and heavy machine-shop work. It is made in several sizes; the one shown is the largest. It can be built with two traveling heads instead of one, as shown, and with two tool posts on each traveling head. The one shown is 10 ft. 6 in. long, and will plane 8 ft. in length, 25 in. in width, and 24 in. in height. Pieces 42 in. high will clear the traveling head when rested on the floor, and when the machine is located over a pit pieces of great length can be finished.

The head of the machine is driven by a screw running the entire length of the bed. The screw is driven by high-speed pulleys and shifting belts without the use of gearing. The head is provided with a quick return, the belt being shifted by the adjustable rack shown over the top of the machine. The head, being driven by a screw, moves without jar, and from the end of the arm heavy cuts have been made in cast steel without chatter, leaving the work perfectly smooth. The overhanging head is so firmly attached to the bed of the machine by long guides and adjustable gibs that it is sufficiently stiff for all practical purposes, even when the tool post is at the extreme end. On the belt-shifting device above the machine there are adjustable tappets which are moved by projections on the heads, which cause an automatic reversal of the machine.

The angle plates and square tables on the side of the machine can be set in any position along the bed or removed entirely when planing heavy frames and castings, such as could not be finished on a planer of ordinary dimensions. Having two tables, material may be adjusted upon one while work is being done on the other. The stroke of the head, not being confined to any one portion of the bed, prevents undue wear in any particular point. The well-known advantages of moving the cutting tool instead of the parts to be finished are secured in this machine. Some of its advantages are that the weight and friction of the sliding carriage is the same at all times and do not increase with the weight of the work or the length of the machine bed. Again, the work remains stationary and may be conveniently and securely fastened to the tables, so that

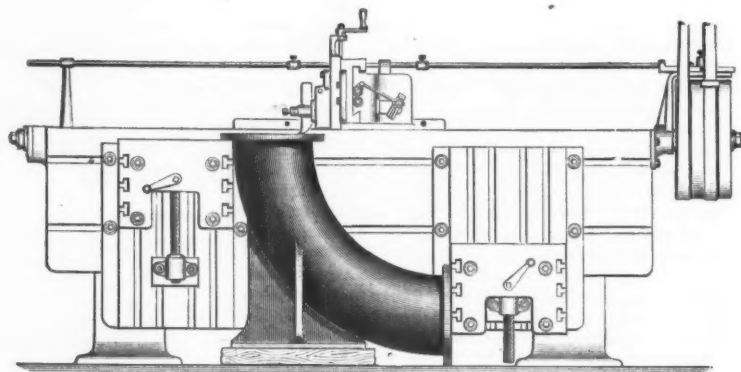


Fig. 3.

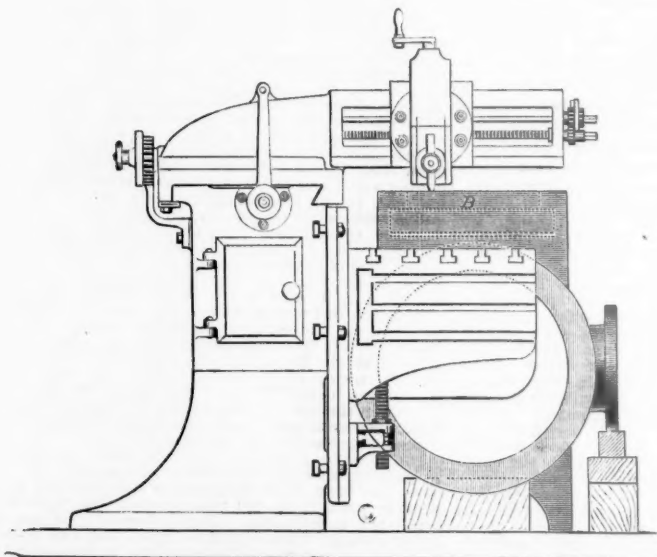


Fig. 2.

RICHARDS' OPEN SIDE PLANER AND SHAPER.

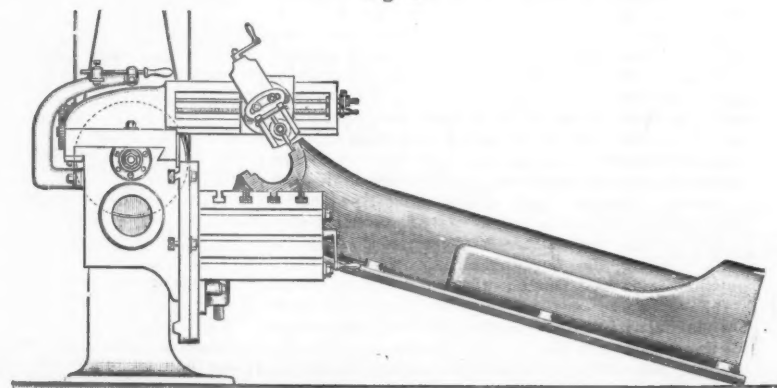


Fig. 4.

the cutting tool, when planing large or heavy work, may operate at the same height or level as when used upon smaller pieces.

It is necessary in order to fully understand the operation of the machine to inspect it while working, but the idea of the universal nature of the tool and the many different sizes and shapes of parts which can be finished on it may be obtained from the illustrations herewith. It will be noticed that the slotted plates can be set in any position to receive work of irregular form. They may be used as chucks, braces, or supports for irregular shapes, and filling pieces may be bolted between them, thus making one continuous bed the whole length of the main frame. Fig. 2 shows the machine operating upon the valve seat of a steam-engine cylinder; fig. 3 when facing the ends of a quarter turn of a large cast-iron steam pipe. It will be noticed that no special fixtures of any kind are required, only the ordinary clamps and bolts being necessary. Another position for this kind of work is to place the pipe at right angles to the position shown; the end of the pipe projecting outward at right angles from the bed. In this position the tables are brought together and the lower side of the flange rests upon them. One short jack-screw or wedge is placed between the pipe and the table nearest the pulleys, which holds the work rigid and prevents any possible movement. Fig. 4 illustrates the uses of the machine in facing the ends of engine beds or other large castings which would have to be finished on a slotter in a much less convenient position. If the face of the bearing was of considerable length, the stroke of the slotter would have to be large in order to make the required length of cut, while with this machine the length of the cut is immaterial. In planing work of the kind shown in this figure no extra fixtures are required. The tables when brought together act as a chuck, which firmly holds the parts.

To properly present this machine Messrs. Pedrick & Ayer have issued a special catalogue of 34 pages, with many illustrations of its uses. Such is the universality of this machine that the description is inadequate to give an accurate idea of its functions, and a visit to the manufacturers' establishment where several can be seen in operation is recommended.

New Six-Roll Double Cylinder Planer and Matcher.

We give herewith a cut of the improved heavy planer and matcher which has just been brought out by the Egan Co., of Cincinnati, O. This machine has been designed for general surfacing and matching where speed, strength and good work in large quantities are desired. It is specially adapted to mills requiring a large range of work, and is also suitable for railroad and car shops, bridge works, and large planing mills desiring a good surfacer and a good matcher for both heavy and light work.

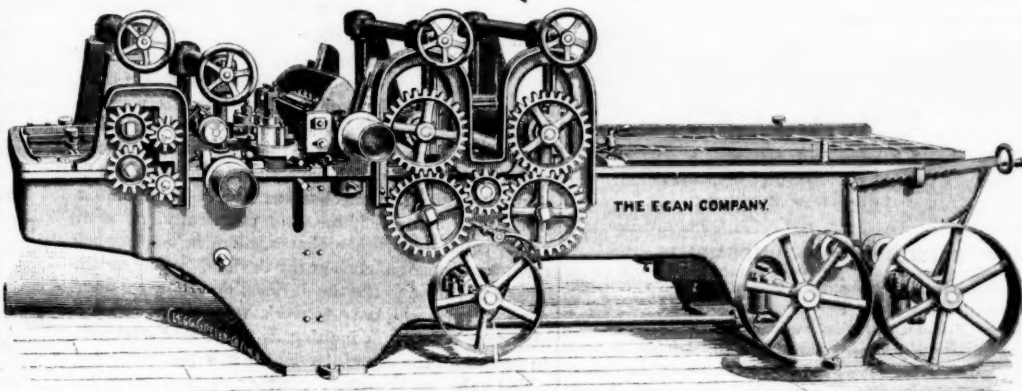
The frame is cast plain, braced and ribbed on the inside, giving great strength and presenting a smooth face on the outside. The edges are curved so as to increase the strength of the castings.

The upper and lower cylinders are both forged, and made of hammered steel and slotted on all four sides, and the cylinders are both double belted. Any kind of a knife can be placed on these heads, as the double pressure bars on each side of the knife are adjustable to and from the knife. The lips or chip breakers on each side of under head are adjustable, so as to regulate themselves to the kind of knife used. Adjustable pressure bars are placed on each side of knife and inside of feeding rolls, holding the lumber firmly as it is being planed. The bars are adjustable at will of operator, so as to accommodate irregular knives and allow a full clearance.

The feed consists of six 6-in. feed rolls, having a new improved expansion gearing device, which prevents either end of the roll from being forced down lower than the other, thereby making a steady and reliable feed. There are two changes of feed, viz., 45 to 65 ft. per minute. The machine is of a large range, planing 24 in. wide (either three or four sides), 6 in. thick and matching 14 in. wide. The adjustable swivel box is a very ingenious contrivance, allowing the roll to adapt itself to any board of uneven thickness, thereby preventing an undue strain to gearing and screws, giving equal pressure to each side of board. The back feeding rolls are weighted and the front ones have springs. It will be noticed that the last pair of feed rolls are placed outside of the lower cylinder, so that each board is fed entirely through both heads, and entirely out of the machine.

The side heads, with their spindles, are adjustable horizontally or vertically from the working side of machine. When side heads are set for a certain width, a hand nut locks them, and no slip can take place. Adjustable hold down brackets are fitted to each side spindle hanger to hold down the stock while the matching is being done.

The machine can be changed from a planer to a matcher, and vice versa, in one minute. The matcher heads, together with their spindles and frame, can be instantly dropped below the line of cut without removing the heads, and the machine will then plane 24 in. wide. This is done by a single lever from working end



NEW SIX-ROLL DOUBLE CYLINDER PLANER AND MATCHER.

of machine, and the operator who feeds can do it without leaving his place.

The independent beader is adjustable at the will of the operator, and can be instantly set to suit the desired depth of cut.

The builders can furnish this same machine with four 6 in. feed rolls, and with or without the beader; but for doing large quantities of any kind of hard wood six rolls are recommended.

For further information address the builders, the Egan Co., Nos. 202 to 222 West Front street, Cincinnati, Ohio.

Pancoast's Ventilating System for Cars.

The correspondence which has appeared in recent issues of the *Railroad Gazette* will have made the reader somewhat acquainted with the general theory of Mr. R. M. Pancoast for preserving perishable produce in transportation by ventilation. We show herewith his designs for ventilated cars, and give his own description.

A vertical direction is not only the natural one for ventilation generally, but, in the case of cars particu-

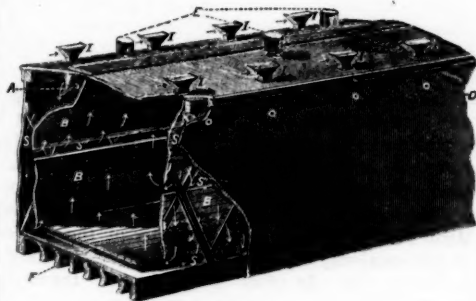


Fig. 1.

larly it is certainly the best, as it is the shortest distance in the car, and is the only way to actually air the goods loaded in a freight car; and to secure a positive, clean, vertical ventilation in the car, it is essential to preclude lateral ingress, via any of the usual haphazard openings in the sides and ends of the car. I propose to secure this vertical positive ventilation, automatically with the mo-

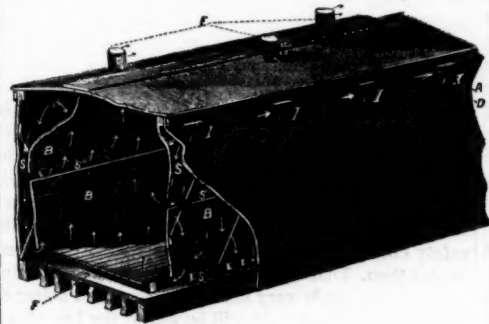


Fig. 2.

tion of the train or wind, by the easiest and cheapest means, with the simplest appliances possible, and without interfering with the usual construction of the cars. My design will also keep out the light and dirt, which are great drawbacks to the present style of so-called "ventilated fruit cars," which, at best, only permit a haphazard ventilation of a portion of the space about the load and admit the injurious light and dirt to the load.

Figures 1 and 2 represent a portion of a car body showing my system of vertical ventilation. Figure 1 shows the distribution of the weather-proof exhausts *E* over the body of the car, and the rain and dirt arrester intakes *I* on the edge of the car roof. Figure 2 shows a form of the intake applied under the edge of the roof, or to the side of the car.

The construction is easily and cheaply applied to regular freight cars, by extending the sheeting *BB* up to the roof, making an air passageway *SS*, from the roof down to the floor; and the air passageway is continued under the load *S'*, by means of a perforated floor *F*, preferably removable in sections. This air passageway between the two shells of the car may be terminated at will, at an intermediate place *S''S'*, between the roof and the floor, to suit the nature of the goods. The intake ventilators *I* connect with the air passageway, between the two shells of the car. The exhaust ventilators *E*, connect with the body of the car, over which they are scattered.

The rain and dirt arrester intake ventilator consists of a fixed hood with screened, sloping openings and an inside deflector, in combination with a sloping rain and dirt arrester appliance beneath *A*, which has a rain and dirt discharge issuing to the outside of the car *D*. The weather-proof exhaust ventilator consists of a fixed hood, so constructed as to be as effectually proof against any ingress whatever as it is a positive exhaust in whatever direction the air strikes it.

The only openings to the inside of this car, when loaded for shipment, are through the ventilators, and therefore no light is admitted. The intake ventilators are located where they take in the best air the train passes through, considering the smoke stack emissions above and the surface heat and dust below. This screened air is deflected down; and any heavy material that may enter, naturally strikes the bottom of the oblique arrester *A*, which discharges it again from the car, the incoming current of air hastens it out—the impact drives the heaviest along the bottom of the arrester and out the openings provided *D*; the lighter, cleaner air floats over the arrester, and is pressed down, producing a constant vertical downward current, between the two shells of the car. This current cuts off the sun heat, and issues under *S'*, or over the load *S''*, as the case may require, or both under and through and over the load at the same time.

In the case of fruits, berries, etc., in packages, when it is desired to pass the full flow of air through the goods, the upper openings *S''S'* in the inner shell are closed, so that all the incoming air is then forced down to and through the bottom opening *S'S'* and under the perforated floor, thence up through the load. But when impracticable, or unnecessary, to pass the air through the goods, as with bulk shipments of grain, fruit, etc., then the perforated floor is removed and the current is passed into the car proper, solely through the upper openings in the inner shell, and thus wholly issued directly over the load.

The motion of the car, in either direction, forces air in via the intakes at the upper edges, and passes it down between the two shells of the car, and thence under and through or over the load; and simultaneously the motion of the car acts on the exhausts which draw the air up, from the load, and discharge it from the car, thus keeping up a continuously downward current of fresh air, which is made to pass under and through or immediately over the load, or both through and over it, to continuously and effectually remove the heat, sweat, etc., as fast as exhaled from the goods.

This car, with the ventilators dampered off, or the cowls removed, and the openings capped over, becomes an air-tight winter car. Its construction, being necessarily double-shelled, then enhances its winter serviceableness, by the increased protection the double shells offer against the cold.

South African Railroads.

The government of the Cape of Good Hope have instructed the London and Westminster Bank (Limited), to invite tenders for £1,150,000 of stock. The loan is being raised for the purpose of clearing off the £400,000 advanced to the Cape Colony by the Imperial Government five years ago to carry out the line of railroad between Hopetown and Kimberley. The balance is to be employed for railroads now in course of construction, to keep which work going the general revenue of the Cape Colony has been drawn upon. The prospects of the Cape Colony being of the brightest, there can be no doubt of the wisdom of spending money on railroads to develop the vast resources of the country. That the loan will be promptly subscribed there will be no manner of doubt. —*Exchange*.



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

An important meeting of representatives of men in different branches of railroad service has just been held at Elmira. The most noticeable thing in the speeches was the general expression of disbelief in strikes, and the prevalence of the opinion that labor organizations could do more by working with the managers than by working against them. If the purposes of the Elmira meeting could be carried out, it would be a great gain in all respects. Unfortunately, it is easier to secure acceptance of such doctrines in the East than in the West. A number of reasons combine to produce this difference. In the first place, Eastern railroads are largely owned at home, while Western railroads are almost entirely owned by men who live hundreds or thousands of miles away. In the East, the employees come in actual contact with the investors; in the West, there is often a feeling of sectional hostility. This feeling is intensified when a manager comes to be regarded as a representative of Eastern capital against Western labor. The temptation to the laborers to stand up and have a trial of strength is overwhelming. Sometimes this state of things results from the managers' own want of sense or of tact; oftener it comes from adverse business conditions. Things change so rapidly in the West that the necessity for sweeping reductions of expense is much more frequent there than in the East. Sometimes a parallel road will take away half the traffic of an old line; sometimes an act of the legislature will take away all its profits. In either case the employees must suffer; in neither case are they likely to recognize the true cause of their troubles. Last, but not least, the frequent change of conditions has its effect on the character of the men themselves. The Western man is more aggressive; he is much less conservative, even in those cases where it is for his interest to be so. He has been so accustomed to regard the higher officials as his antagonists that he does not see how far the common interests of railroad owners and railroad men outweigh the divergent ones. As this fact is recognized, we may expect to have fewer strikes and more good for both sides; but it would be idle to deny that, in some sections at any rate, we shall have to wait a long time before reaching this goal.

The Time Convention has arrived at a critical period in its existence. A dozen years ago, after its original mission became a dead issue, and before it took up standard time and standard rules, it came near dying. Many members now regard train rules and car service as settled (though they are not), and in the absence of another important question that can easily be discussed there is a danger that the members may again look upon the organization as one without a mission. But in reality there are too many subjects pressing for discussion rather than too few, and the state of the case is succinctly set forth in the admirable address of Colonel Haines

which we print in another column. "Safety Appliances" is indeed a hard subject, because it covers such a broad field. In brakes, couplers, steam heat, and other distinctly technical matters it is, perhaps, doubtful whether managers have any province other than to give strong support to their subordinate officers in the associations which have already made such substantial progress on mechanical lines. In signaling, mechanics and discipline are, practically, of more nearly equal importance; that is, there is not so much room for discussion concerning devices, while on the question of how to use the devices, and how to discipline the men who have to work with them, there is abundant ground for inquiry as to the best methods. In signaling, the superintendent is in a measure compelled to be an engineer, whether his education has been in that direction or not, because the questions pertaining to it cannot be shifted by wholesale to some other department. The most suggestive part of Colonel Haines' address is that concerning the necessity and value of good discipline. If the Railroad Gazette office were well stocked with the phrases of political newspapers we could "point with pride" to the fact that these ideas, apparently so heartily approved by this meeting, have been persistently preached in these columns for many years past. The elevation of the efficiency of the personnel of the railroad service is not only an inviting field for the Time Convention, but is one which the Convention's past work very naturally leads to. A continuation of the rule-book discussion, if followed out as one would follow it out in his own office, for his own road, will mark out a path for the consideration of all branches of discipline. In the direction of absolute uniformity of rules it may be that the Convention has come to a stopping place, but in the matter of learning from each other, of interchange of thought for the purpose of making the good practice of the few available for the many, the members have still an unlimited field before them.

The question of safety chains is brought sharply to notice by the complete failure of the chains in the Lake Shore disaster. In one view of the question, this was the most disgraceful of the three or four failures. A failure of the ordinary and usual coupler, which was just the emergency for which a safety chain is provided, demonstrated the total inadequacy of the latter. This question is one that does not admit of precise treatment, for the reason that the conditions under which the chains must act are not well defined. Many railroad officers are decidedly of the opinion that the majority of such chains would fail if brought to a severe test. In other words, there are thousands of chains constantly taking free rides around the country on the ends of passenger cars which would much better have been thrown into the scrap heap long ago. As Josh Billings said concerning a noted statesman, it would have been \$10 in their pocket if they had never been born. The one duty required of a safety chain is to withstand a sudden shock. This shock takes place when cars are broken apart, and occurs at the moment when they have separated far enough to draw the chains taut. The rate of speed at which the forward car will be moving, or rather the difference between its speed and that of the hind car, cannot be determined with much accuracy, and therefore the theoretical strength of chains has been given little thought. Older readers will recollect the exposure several years ago of the fact that thousands of check chains for holding trucks in position when derailed were utterly inadequate for the purpose for which they were supposed to have been designed. It would appear that the present status of so-called safety chains is about the same as was that of check chains then. That agitation was the means of introducing on some roads very much stronger and better designed check chains. It will be well if the Lake Shore accident shall lead roads which now spend money in putting on "safety" chains to see that those chains are amply strong. A critic has alluded to the liability of pulling out the end timbers of a car if chains are made strong enough to withstand the shock of a violent pull exerted by a heavy locomotive. Of course they could be so fastened that they would tear the whole floor system to pieces before they gave way. It is merely a question of expense. If it is not worth while to have safety chains so strong and so well fastened that they are safety chains, is it not better to do away with them entirely? The Pennsylvania, which has used the Janney coupler longer than any one else, and much more extensively, uses no safety chains. If this road, with its intelligent officers, careful management and ample opportunity for collecting the results of experience, feels safe to run its trains without safety

chains, it is at least pertinent to inquire what the other roads think about it. Certainly, there is no sense in applying and maintaining chains to be coupled and uncoupled day after day for years, if they are out of service 364 days in the year and are useless when required to do something the 365th.

The Responsibility for the Bay View Collision.

The report of the New York State Railroad Commissioners on the break-in-two and collision on the Lake Shore & Michigan Southern at Bay View, N. Y., March 6, is not so thorough as we had a right to expect. They give little that is new in the way of facts. They lay the chief blame, as they must, on conductor Hough-taling. They say he ought to have "notified" the men on the rear of the train that they were without air. In speaking of the breakage of the safety chains, they say that the failure of the coupler at Dunkirk "tore the staples from the car." They do not say whether it was the Lake Shore or the Wagner car that had chains fastened with staples, and give no further description or criticism of such an extraordinary piece of mechanical design as fastening safety chains by staples. They give no drawing of the Cowell coupler, and little description of it. They say that the knuckle forming the hook is kept in place by a tongue, which is kept in position by gravity only; that this tongue has a bearing surface upon the arm which it is intended to hold of only $2\frac{1}{2}$ sq. in.; that its edge had been worn and broken away, making the bearing surface materially less than $2\frac{1}{2}$ sq. in. On this meagre statement the board "deems that such couplers are in the highest degree dangerous and should not be used." The Commissioners have not discovered who pulled the brake cord. They confirm the report, which we printed at the time, that the freezing of the brake coupling by means of water that dripped from the steam coupling was the cause of the hose pulling off. They think it probable that the day coach was narrower than the sleeper, thus admitting of the telescoping. The board imputes bad judgment to Engineer Mooney for leaving Dunkirk with only six cars under his control. All railroads are recommended to give the public brief statements of the salient facts, and the names of killed and injured in case of such accidents.

The questions of safety chains and couplers we will not stop to discuss here, further than to say that the board has passed a serious condemnation on a coupler that has been in service for many years, and upon roads of high reputation, upon a very insufficient statement of facts. The Cowell coupler, when intact, does not depend on gravity alone for locking; and even if it did, that principle alone is common to most of the M. C. B. couplers, and to pronounce it "in the highest degree dangerous" is an extravagance of statement which immediately weakens the effect of the whole report. It implies absolute recklessness on the part of a good many responsible railroad officers.

While the Commissioners have spoken with uncalled-for vehemence concerning the coupler, they remain silent on two or three important and obscure points which the coroner's jury brought out quite prominently in their verdict. That jury said that the rules were imperfect, that the number of brakemen was insufficient, and that they had reason to believe that the Division Superintendent knew of loose practices in the running of trains on his division. If the jury were not warranted in making such a sweeping condemnation, it is the duty of the board, from which the whole state has a right to expect an expert decision, to examine the question and disprove the unjust accusation; while, on the other hand, if the jurymen are correct in their view, the Commissioners, who are presumably better acquainted than the jurors with technical railroad matters, ought to show the grounds sustaining it. In some respects the verdict of the jury which was printed in our issue of March 21, page 193, is better than the report of the Commissioners.

As the jury published no evidence for their finding concerning Division Superintendent Couch, and as the Commissioners ignored that branch of the subject, he may be said to have come out of the investigation quite fully vindicated. Certain railroad papers have said that the management of the Lake Shore is narrow and that a stingy policy governs all branches of the operating department; but no evidence is brought forward to support this statement, and we can hardly suppose that the coroner's jury based their finding on such vague generalities. Accusations of a similar kind are brought against nearly all railroads by those who are especially ill informed on railroad matters; carrying out, we must suppose, the principle that

"God sends country lawyers an' other wise fellers
To start the world's team when it gets in a slough."

The old question as to the proper number of brake

men on a train is one of the incidental but important ones which this accident brings up. Every one knows that a passenger train which must be braked by hand should have at least one man for every two cars. The running of 12-car and even 15-car trains, with only two, or at most three, brakemen, is common, especially in the West, and responsibility for it is undoubtedly with those who control the appropriations. Many of the older roads in the East employ as many brakemen on passenger trains as they did before the advent of air brakes, but they say that this is a precautionary measure and is largely for the purpose of affording a liberal number of attendants to assist passengers and do other work in the nature of a porter's duties. These roads believe as fully in the infallibility of the automatic brake as do those which employ fewer brakemen. When we come to consider the matter of safety by itself the question is, Will a conductor, when confronted by such a dilemma as Houghtaling met on March 6, grasp the situation sufficiently to take the necessary precautions? Houghtaling most certainly should have posted a dining-car waiter, a sleeping-car porter, a water boy, or some trustworthy man at each brake, or rather in such position as would enable them to control every one of the cars in the rear portion of the train; or, failing in this, he should have secured the assistance of the station agent at Dunkirk in procuring extra men there. We are not unmindful that this was not the best way out of the particular complications in this accident, but we are now speaking of the general question of what to do when the air brake fails. Practically, then, is Mr. Conch, or the General Superintendent, or are the directors to be blamed for not impressing upon Houghtaling (and all their conductors) the vital necessity of taking such extreme precautions as this? If the Lake Shore officers are at all blameworthy in this respect, it is because they have not thus trained their conductors; but a court in blaming them would have to decide that many other railroad officers are equally at fault. The Lake Shore officers could plausibly claim that they are well up to the average. All officers who depend on a book of rules to shift responsibility from their own shoulders to that of trainmen would fall back on the general regulation that conductors must always take whatever precaution may be necessary to insure safety. This, however, is not a good defense; the instruction of conductors and other trainmen is a constant duty, and instruction includes the idea of finding out what pupils know; it is not merely setting facts before them. A book is not sufficient either for old men or new.

The Commissioners blame the engineer for poor judgment in starting from Dunkirk. The officers of the road have discharged him on the same ground. We think, however, that this discharge is somewhat arbitrary, and the opinion of the Commissioners is expressed in too meagre terms to carry conviction. It is true that the engineer's defense (that he must obey the conductor unless the latter invites him to disobey) is a poor one; but yet, as he was not informed of the inefficient state of the brakes until after he had started, we think it may fairly be treated as a question of speed. Mooney told a reporter that his normal speed at the point of collision was 50 or 60 miles an hour, and that he was actually running less than 40. The road blames him for not being prepared to make an emergency stop, but as he could at a low speed make as quick a stop with half his brakes as he could with all his brakes at a high speed, it seems questionable whether he was not within a fair margin of safety. We are not justifying him, because we do not know all the fine points of evidence, but his condemnation on the grounds thus far made public seems excessively severe, to say the least.

The American Society's Committee on Rail Sections.

At the last summer Convention of the American Society of Civil Engineers, a resolution was offered to appoint a committee to report to the society a set of standard rail sections. This resolution was adopted by letter ballot, and the committee was appointed. At the last annual meeting a resolution was introduced, discharging that committee. This was submitted to letter ballot and has been lost. Therefore, the committee stands.

One reason for again voting on the matter was that the total vote cast on the first ballot was but 253, about one-quarter of the voting membership. It was said that so small a vote did not fairly represent the opinion of the members. On the second ballot the total vote cast was 217, and meantime the membership has somewhat increased. Therefore, this second vote is still less representative than the first. It is unfortunate that the vote was not larger; but no one can

find fault with the result, for certainly all members had a fair and ample chance to express their opinions.

The resolution to appoint the committee was passed by a vote of 218 to 35. The resolution to discharge the committee was lost by a vote of 125 to 92. Judging from the votes alone, it appears that interest in the matter has declined, and that opinion against an attempt to fix standard sections has increased, but the votes are too small to be very conclusive. Either result would be unfortunate. We have frequently expressed doubt of the wisdom of formulating a set of standards now, for the reason that experience with the recent, and apparently most rational, sections has really been short and limited. While we have great confidence in what we may call the Dudley-Hawks-Hunt principles of design, we think it highly desirable that they should be tried longer and in a greater variety of service before the American Society incorporates them in a set of standards. This is especially important for the reason that in the sections designed by these gentlemen the tendency has been constantly toward less and less metal in the head, and a more perfect "balance" of the area of the section. Therefore, while the Dudley section with 44 per cent. of the metal in the head has been in use for a sufficient time to give it a good test, Hawks, Hunt, Potter and Delano have designed sections with from 42.4 down to 40.7 per cent. in the head, and these have had really but short service in the track. Yet we have little doubt that were a set of sections to be made up to-day by the American Society's committee it would follow very closely the ideas of these latter gentlemen. There are other particulars in which the experience of the next two or three years will probably be especially valuable. This is why the committee should go slowly. But because we believe it will go slowly, and because it can meantime do a great deal to stir up interest, to promote sound practice, to induce accurate observation, and to disseminate good doctrine, we say that it would have been unfortunate had it been discharged.

We should suppose that the best work that the committee could do for the next four years would be to publish progress reports from time to time, and that about the most hazardous work it could do would be to get the society to adopt a set of standards within one or two years. It would be hazardous, but not by any means necessarily wrong. On the contrary the sections might prove to be just right, and the committee win great credit for its courage and acuteness.

The fundamental objection to the appointment of a committee on standard sections, that the Society has no business to make standards of design, we shall not discuss. There will be time enough to settle that later. Whether or not the Society adopts the standards the world will be the richer for the committee's labors, and the committee will have the glory.

The Western Associated Railways.

Before this reaches our readers, more will be definitely known about the plans of the Western Associated Railways than can be told at present. But last week's meeting showed the general lines on which the new organization will probably be formed. It avoids some of the errors which have interfered with the usefulness of the Interstate Commerce Railway Association. Thus far it marks an undeniable advance. But whether it will meet the necessities of the case much better than its predecessor did seems open to question. It is not so likely to break down; but we do not know whether it is much more likely to work.

An association of this kind has three distinct objects:

1. To furnish a means for discussing and settling questions of general policy in which the associated roads have a common interest: where their representatives differ as to the methods to be employed rather than as to the results to be attained. In this aspect, a traffic association is like a car-builder's association, or a society of engineers, except that it is more continuous in its activity.
2. To provide a board of arbitration where the different members have different objects in view, but do not wish to fight about them. In this aspect, the association is like a court, except that its decrees have much less authority behind them.
3. To prevent or punish violations of the agreement, and irregularities which would tend to defeat the purpose of the organization. In the past the chief means of preventing such irregularities has been the pooling system. Since the passage of the Interstate Commerce Law other methods have been resorted to with indifferent success.

The association must thus combine, to some extent, the functions of a debating society, a court, and a

squad of police. These objects, especially the first and third, tend to interfere with each other, and to make the problem even more difficult than would otherwise be the case. The Interstate Commerce Railway Association laid chief stress on the second object; the new association makes greater provision for the first. Neither of them has really grappled with the third.

In dealing with questions of general policy, an association must be wide enough to include most of the parties affected; but it must not interfere with the freedom of these parties in such a way as to make them chafe under its restrictions. The Interstate Commerce Railway Association provided for the first of these points, but not for the second. It referred all questions of policy to the central authority. It prohibited its members from making contracts with one another, like the Union Pacific-Northwestern agreement; this was one of the rocks on which it split. This error of over-centralization is avoided under the new form of agreement. The scheme now proposed is federative rather than centralized. Private traffic agreements are allowed. Separate freight associations are recognized and given prominence. Lines subject to outside competition are allowed to take the initiative in reductions of rates, instead of being acquired to seek authority from the association. The power to stop such reductions is not vested in the general association itself, but in the commissioner of the separate association immediately affected. All this will prevent strains from coming upon the new organization, and will make it less liable to break down. The only question is, whether it will leave it strong enough to accomplish anything. If you have to spend all your time taking care that your engine does not give out, it begins to be doubtful how far it is wise to run that engine at all.

With regard to arbitration, the contrast between the old and the new articles of agreement is still more marked. In the old Association, a board was provided for settling differences, and its award was to be final. In the association now proposed, parties may refer their differences to arbitration if they want to; that is all. Only in cases of alleged violation of the Interstate Commerce Law or of the agreement itself is a semi-judicial decision made compulsory. Even here, no penalties or sanctions are provided, except those in the conscience of the railroad presidents themselves; and the operations of conscience are wisely limited to 90 days from the date of award.

With the abandonment of penalties, anything like police duty falls away from the association as a matter of course. It even abandons the attempt to prevent irregularities. The old agreement contains the sentence: "The executive board shall from time to time on the application in writing of an accredited representative of any company, the President of which is a member of the association, take such steps after full hearing of all parties in interest as may be proper, requisite and legal to secure to each company its due share of the competitive traffic."

The new one simply says that any two or more companies may agree upon measures for securing to each its due share of competitive traffic. The former might possibly amount to something; the latter is a distinct confession of impotence. Two competing lines, under such a special agreement, must either divide traffic or arrange a differential. In the former case, they violate the Interstate Commerce Law; in the latter case they make the association nearly useless. An association which delegates to its members the power of making differentials to suit themselves has pretty much destroyed the reason for its own existence.

We are glad to see that the general expression of opinion among those at the meeting was in favor of incorporating more distinctly the feature of division of traffic. Unless something of this kind is done, we agree with Mr. Midgley in preferring separate associations with committees of conference, instead of the pretense of a general association, deprived as it is of most of its powers.

Janney vs. Miller.

Although the above title will be at once intelligible to all readers interested in the subject discussed herein, we should perhaps state that, in its more accurate form, it would read: Shall the Master Car Builders' type drive out all other forms of coupler from the passenger service, as it is (believed to be) destined to do in the freight service? It is apparent from the talk of railroad officers that the collision on the Lake Shore & Michigan Southern March 6, resulting from the breaking of a Cowell coupler, has had the effect of increas-

ing the general interest in the question of a uniform coupler for all classes of cars.

The Cowell is not very generally used, and the question is looked at not so much as one concerning the merits or defects of that particular coupler, but more as a matter of types. The Miller uncouples with so much difficulty that it is generally regarded as impracticable for use on vestibuled cars, so that to keep up with modern requirements a change of some kind must be made; and any discussion of details at once runs into a general consideration of the relative advantages of different types and the need of uniformity.

Now that the Janney type is adopted as the M. C. B. standard, the Pennsylvania has practically established on its own extensive system a uniform type for all classes of service. This company has in some respects pursued a hesitating policy, but the question of uniformity in type seems now practically settled. As every one knows, the great majority of roads, aside from those in the Pennsylvania system, were using, and mostly still use, in passenger service, the Miller. These roads, in considering the question of the Master Car-Builders' standard for freight service, have to face the disagreeable fact that, notwithstanding all the advantages secured by the change, they still will be left with a difference between their freight and passenger types nearly as bad as that heretofore existing. But in spite of this and all other difficulties, it seems logical to expect that a single type must ultimately prevail, and that therefore the Miller must sooner or later go to the wall. As in the case of standard and narrow gauge of track, the majority must rule, and without discussing the demerits of the Janney or the merits of the Miller, it may be admitted that the days, or at least the years, of the latter are numbered. This is the main question the discussion of which has received such an impetus from the late collision.

General managers who are impartial, and who judge things on their merits instead of by narrow prejudice or short-sighted expediency, do not waste their time on the possible improvement of the Cowell (assuming that it is wrong in design of details, as stated by the New York Railroad Commissioners) but say at once that this is simply an additional reason for hastening the change of all cars, passenger and freight, to the M. C. B. standard. In the Miller, the vertical plane at the point where the hooks engage is only about 6 in. deep. Whenever the cars are not of equal height, or very uneven track is encountered, there is more danger of uncoupling than with the Janney, and breaks-in-two do actually happen with more frequency than the public is aware of. To couple the hooks it is necessary to bump the cars together with a considerable shock, because the hooks will not engage until the springs are compressed. After a coupler has been some time in use, and the springs are somewhat worn, there is an appreciable amount of slack, and on a long train this will amount to from two to four feet. In case of a collision this is sometimes enough to admit of one platform mounting the other, and in more than one case it has resulted in partial telescoping. And while the elasticity of the springs is thus an objectionable feature, it is found that when a car is standing the springs again make trouble by pushing the cars apart and making it difficult to unhook the coupling. To uncouple a car at night it is frequently necessary to make so much noise in pounding that passengers in sleeping-cars are awakened. With vestibuled cars there is no room for the Miller uncoupling lever, as the platform is so largely occupied by the vestibule, and the buffer (which is the whole face of the vestibule) is so large that to compress it for coupling is exceptionally difficult. The introduction of the quick-acting brake has emphasized the objectionable character of even the little slack found in the Miller coupling. When speed is very suddenly checked, as is often the case with the new brake, the shock produced by the almost instantaneous closing of all slack in a long train produces a very disagreeable effect in the front cars.

These, with assertions concerning high cost of maintenance, are some of the reasons given for urging a radical departure by all roads using the Miller type. While not necessarily admitting that main tracks rough enough to uncouple Miller hooks are at all common, or that with proper maintenance the slack is ever sufficient to cause any greater liability to telescope than would be the case with any existing buffer, every one familiar with the different types will agree that these considerations are not without weight.

Aside from the general considerations making uniformity necessary and desirable, changes in the character of our freight service are likely to bring in a factor not generally recognized. As every one knows, the demand for high speed with freight trains is constantly increasing. As air brakes

are applied to freight cars and the advantages of quick transit are realized in concrete form instead of being presented in mere theoretical shape, fast freights are called for in unthought-of directions. Only the other day the *Railroad Gazette* mentioned the transportation of some carloads of exceedingly "dead freight" (flour) by passenger train. Thus the speed of freight trains and that of passenger trains is coming to be more nearly the same, and it follows logically that mixed trains are to become more general. This is not the case, of course, on trunk lines, but with the smaller roads it is an important matter. Hitherto mixed trains have been employed as little as possible for two reasons—lack of uniform couplings, and lack of proper brake power. Now both of these objections are being removed, and a third reason, absence of demand for fast freight, disappears coincidentally. As just remarked, this problem is more important with the smaller roads. They do not have to run their passenger trains so fast, and so can often work a considerable economy by putting passengers and freight together, now that it is found absolutely safe to do so. And as nearly every large company has numerous subsidiary lines in its system, all officers should be interested and be fully awake to the bearings of the problem.

The change from Miller to the M. C. B. type for passenger service, which was begun on the Chicago, Burlington & Quincy several months ago, has, we understand, been completed satisfactorily. There was necessarily a "transition period," even within the limits of the passenger service of a single road, but it was successfully dealt with by the use of the adjustable "hood," by which a Janney coupler is stuck on to the end of a Miller hook and fastened through the hole left for inserting the old-fashioned pin. The Southern roads, which, by reason of their interchange service with the Pennsylvania, have had to use a good many of these hoods, are tending toward the M. C. B. type. Some of them are already refusing cars with Miller couplers, and one company owning about 100 passenger train cars has just finished equipping the whole with the Janney.

A Heavy Train.

Some of our English readers do not seem to appreciate the capacity of our locomotives when hauling heavy trains, and for their benefit, as well as for general information relative to heavy train loads, the following note of a trial of a large locomotive on the Pennsylvania system is given. The load was probably the heaviest ever hauled in this country by one engine. The locomotive was a Pennsylvania standard "class R" engine, No. 1,334. The trial was made on the eastern division of the Pittsburgh, Fort Wayne & Chicago, from Conway to Allegheny, a distance of 20 miles, having as its object to ascertain the ultimate load that a "class R" engine would haul on a nearly level track. The train consisted of 79 cars of iron ore and six box cars loaded with pig metal and other iron products, making a total of 85 cars, or about 2,400 tons. Most of the distance was over a level track, with the exception of about a mile, where the grade was about 15 ft. to the mile. On this grade the engine worked full stroke, and with the throttle wide open was able to maintain a speed of about six miles per hour without slipping, very little sand being used, as the condition of the rail was favorable to the test. The average speed was too slow for practical purposes, and of course was only maintained at an unreasonable expenditure of power. While these results were not sufficiently practicable to meet the daily exigencies of service, yet they prove that the present design of "class R" engines has sufficient adhesive weight to utilize the full power of the cylinders on a good rail, without slipping, and also that it could keep a train with the above enormous load moving at a slow speed on a grade of 15 ft. per mile.

It may be interesting to speculate a little regarding the resistance of the train hauled by this locomotive, and with regard to the adhesion of the drivers. The steam pressure in the boiler was 160 lbs., and the probable loss between the boiler and the cylinder at the speed attained was about 10 lbs. The mean effective pressure in the cylinders was not far from 130 lbs., which is an estimate based upon indicator cards from similar locomotives taking steam full stroke. Allowing 8 per cent. for engine friction, the pull on the drawbar must have approximated closely to 23,000 lbs. with a bare possibility of its being 24,000 lbs. This would give a resistance per ton of load not far from 10 lbs. The weight of the locomotive on the drivers is 100,600 lbs., or about 50 tons. The adhesion, therefore, utilized by the steam pressure—it being noted that the drivers did not slip—was about 480 lbs. per ton. This adhesion might be expected in ordinarily good weather. The

maximum adhesion ordinarily attainable is about 600 lbs. per ton on drivers, while a minimum may be as low as 200.

Some English writers have recently expressed a doubt as to the economy of heavy train loads, but such opinions are not based upon American experience, or conditions anything like those which obtain here. To the contrary, we instance the fact that the introduction of the "class R" in place of the "class S" on the Pennsylvania Railroad has considerably reduced the fuel consumption per ton mile. Just how much this reduction is it is impossible to state, because the returns include gains from other improvements. The difference between the "class S" and the "class R" engine is principally in weight. They are both 20 in. x 24 in. consolidation engines, with 50-in. wheels. The weight on the drivers of the "class S" is 94,200 lbs., while that for the "class R" is 100,600 lbs. The difference in weight arising principally from the difference in boiler dimensions. The area of grate in the "class R" is 31 sq. ft., while in the "class S" it is but 23. The total heating surfaces are 1,731 and 1,337 sq. ft. for the "class R" and "class S" respectively. The difference in capacity of the engine is sufficient to give to the "class R" an important advantage. For instance, the "class S" can just haul 22 cars over the hill between Allegheny and Alliance when she is worked to a maximum, whereas the "class R" will do the same work readily and easily at a good speed.

The Chicago & South Side Rapid Transit Railroad (elevated) has adopted the 90-lb. rail section of the Philadelphia & Reading, which was adopted last year for the Manhattan Elevated of New York. We published a drawing of this section Aug. 24, 1888. It is 5 in. high and 5 in. base; $2\frac{3}{4}$ in. extreme width of head; 12 in. crown radius; $\frac{1}{2}$ in. upper corner radius; side slope of 8 deg.; fishing angles, 13 deg.; thickness of stem, $\frac{1}{4}$ in. This is the heaviest section used in America, except that of the Chignecto Ship Railway, which is 110 lbs. per yard. The use of a rail so heavy for a road using light locomotives is a heroic departure in search of safety and economy. Probably it is warranted. It was undertaken on the Manhattan Elevated for the purpose not only of providing for the wear under the incessant traffic, but of adding to the strength, stiffness and inertia of the whole superstructure. It is expected that an economy will result in the maintenance of the structure as well as in renewal of rails. As the new Chicago road has taken the chief engineer of the old New York road, many of the ideas which have been developed in his experience here will be carried out there.

French Railroads in 1886.

The main lines of French railroad, as is well known, are in the hands of six great companies, each with a nearly complete monopoly in its own district. A recent number of the *Revue Générale* gives a summary of the reports of these companies, in shape available for comparison with the trunk lines of the United States. The figures are reduced on the following basis:

1 Franc = 19 cents.	
1 Kilometre = $\frac{5}{8}$ mile.	
1 Tonne = 1.1 ton.	
Miles operated.	
Nord.....	2,240
Est.....	2,800
Ouest.....	2,850
Orléans.....	3,770
Paris-Lyon-Méditerranée.....	4,960
Midi.....	1,830
Capital.....	18,450
Stock.....	\$280,000,000
Debt.....	330,000,000
Total, including sundry extra accounts.....	\$2,260,000,000
Assets.....	
Permanent way, shops and real estate.....	\$1,900,000,000
Equipment.....	330,000,000
Cost per mile operated.....	117,400

The extraordinarily small ratio of stock to bonds is explained by the policy of the French government in employing existing companies to build new lines with the aid of bonds issued under a government guarantee. The stock thus remains constant, while the bond issues increase.

The largest figure of cost per mile is on the P. L. M., where it is over \$150,000; the smallest in the Orléans, where it is not quite \$100,000. All these figures may be a little too high, on account of expenditures for lines not yet brought into operation. It is almost impossible to compare the cost per mile of our trunk line systems with these figures, so complicated is the relation between lines owned and lines operated. The Boston & Albany, which is free from this difficulty, shows cost per mile of about \$70,000. Strange to say, though the Boston & Albany owns more locomotives and cars per mile than the French lines, its equipment account is smaller in proportion to the other expenditures.

The equipment of the French lines is as follows:

	Total.	Per 100 miles operated.
Locomotives.....	8,905	43
Passenger Cars.....	19,333	105
Freight Cars.....	227,451	1,232

The figures per 100 miles operated for the United States are as follows:

Locomotives.....	16
Passenger Cars (18, counting baggage and mail).....	14
Freight Cars.....	632

Figures of train mileage are somewhat incomplete as regards separation. The total revenue train mileage is 129½ million against 644 million in the United States. The passenger train mileage is somewhat greater than the freight; on the lines of one company (the Orleans) the mixed train mileage is larger than either passenger or freight. The average number of cars in a freight train varies from 35 to 44; the average load per car is 3½ tons.

With regard to amount of transportation, we have the following figures:

	France.	United States.
Passengers carried.....	194,541,000	451,353,000
Passenger mileage.....	4,288,040,000	11,190,000,000
Average journey.....	22 miles.	25 miles.
Of the total number of passengers, 8 per cent. traveled first class, 30 per cent. second class, and 62 per cent. third class.		
Tons carried.....	79,282,000	589,398,000
Ton-mileage.....	6,881,000,000	65,423,000,000
Average haul.....	87 miles.	111 miles.
Receipts per passenger mile.....	1.38 cents.	2.25 cents.
Receipts per ton mile.....	1.56 cents.	0.97 cents.

With regard to the detail of expenses and of net profits we shall have something to say in a subsequent issue.

The waste of human energy which comes from unscientific methods of making and maintaining country roads is simply incalculable. The waste of the time and money of the citizens in repairs which must be done over and over again, year after year, is serious enough, but it is trifling compared with the steady waste of horse power in moving the products of farms and mills, over badly located and badly made dirt roads, to railroad stations or to market towns. All this is so well known as to be commonplace, but the phenomenally wet year that we have had has made the country road problem more than usually interesting in many parts of the United States. In Pennsylvania there is a strong movement toward a radical change in the road laws. It is believed that provision will be made for scientific relocation of old roads, supervision of construction and repairs, and for abolishing the medieval practice of "working out" the road tax. In the discussion of this matter at the convention held at Harrisburg last January, one speaker said that "of course" the railroads would object to the improvement of the country roads. On the contrary, of course, the railroads have as much interest in good roads throughout the country tributary to them as the farmers and the country store keepers. Perhaps that speaker looks forward to the restoration of the Conestoga wagon as a competitor of the Pennsylvania "Class R" engine in hauling freight over the Allegheny Mountains. The Case School of Applied Science, Cleveland, Ohio, has taken an admirable step in this matter of road improvement. It will give free instruction in road engineering "sufficient to qualify a man of ordinary intelligence to properly locate and manage a highway." An outline of the scheme appears in our Technical column.

The city government of Philadelphia has passed an ordinance looking to the appointment of a special commission to consider the needs of the city as regards rapid transit. It is to consist of the Mayor, the presidents of Select and Common Councils, the Chairman of the Joint Committee of Councils on Railroads, Finance, Highways, City Property and Surveys; three members each of Select and Common Councils to be appointed by the presidents of the respective chambers; the City Solicitor, the presidents of the Pennsylvania Railroad Co., the Philadelphia & Reading Railroad Co., the Philadelphia Belt Line Railroad Co.; two from the presidents of the passenger railroad companies of Philadelphia, the latter, with five citizens of the city of Philadelphia, to be selected in joint convention by these councils.

A good method for testing the durability of the different kinds of varnish is to cover one-half of the side of a car with each. After the car has been in service some time it will be found that the surfaces present quite a different appearance if there is much difference in the varnish. Recently on the Chicago, Milwaukee & St. Paul we inspected a car which was varnished in this way, and found that while one-half was still in good condition, having some polish and a lively appearance, the other half had almost no polish and presented a dead and unsatisfactory appearance. This is a good practical test for car varnish.

The exigencies of sharp competition for the New York and Washington business is pushing the Baltimore & Ohio to continued improvements. Track tanks will shortly be put in on the Philadelphia and Washington line, and it is said that some of the finest passenger coaches yet built will be put in service about May 1.

NEW PUBLICATIONS.

The Coal Trade.—Mr. F. E. Saward, editor of the *Coal Trade Journal*, has issued his valuable and handy annual pamphlet giving a condensed history of the coal trade for the past year, with facts concerning production, prices, and other general matters, together with much detailed information gathered from all quarters, and

arranged under convenient headings. The output of coal in the United States for the year 1889 is estimated at 132,419,342 tons, of which 35,407,710 was anthracite. The latter was all produced in Pennsylvania, and that State is credited with 33,000,000 tons of bituminous. The remainder comes from 26 different States and Territories. Statistics are given by States for the last four years. California's production has decreased during that time, but in every other State reported there is an increase, the largest being in Alabama, Colorado, Dakota, Indian Territory, Kansas, Kentucky, Montana, New Mexico, Tennessee, Texas, Virginia, Washington and Wyoming. The total output is substantially the same as last year, but the increase over 1886 is 25 per cent. and over 1887 10 per cent.

Proceedings of the United States Naval Institute. No. 52.—This number contains articles on Naval Administration in Alaska, Powder in Guns, Notes on the Literature of Explosives and Fleet Tactics. Much the longest and most important article, however, is one on Armor for Ships, by Sir Nathaniel Barnaby, reprinted from the *Proceedings of the Institution of Civil Engineers*. It is an epitome of the history of the development of the various systems of armor.

TRADE CATALOGUES.

Catalogue of Duplex Steam Pumps, manufactured by Barr Pumping Engine Co., Germantown Junction, Philadelphia, Pa.—This is a catalogue containing illustrations and very brief descriptions of duplex pumps made for various classes of services. Tables are given of dimensions and capacity, size of pipe, etc. A diagram is also given showing the general arrangement for the proper piping of a pump.

Buckeye Portland Cement.—This is a pamphlet intended to advertise the wares of the Buckeye Portland Cement Co., Bellefontaine, O. Further than that, it is a valuable little treatise on cements, their manufacture and properties, and on cement concretes. Many tests of strength are given from the experience of engineers in various cities.

Catalogue and Price List of the Acme Machinery Co., Cleveland, O.—This company manufactures bolt cutters, bolt headers, nut tappers and special machinery of various sorts. The little catalogue which the firm issues contains interesting illustrations of various tools and machines made by it, and has valuable chapters on the bolt cutter and on making and recutting bolt cutter dies. A very long list is given of firms and corporations using the Acme bolt cutter.

The Utilization of Niagara.

Some time ago Buffalo offered a prize of \$100,000 for the best scheme for utilizing the power of Niagara Falls, but withdrew it because nothing of practical merit was presented, and now the Niagara River Power Co. brings forward a great project for the same purpose.

The scheme is simply to dig a large tunnel from a point below the falls up and under the American bank of the river, and let this tunnel serve as the tail-race for all the wheels of all the mills that may be located upon the surface and take their water from the river in open canals. The inclination of this tunnel is to be 1 in 100, and it is to be so far beneath the surface that the wheels will be given a head of water ranging from 79 ft., as a minimum, to 125 ft., as a maximum. With a tunnel 25 ft. in diameter, it is estimated that there will be a capacity for 120,000 H. P. According to recent accounts, a contract has actually been signed between the Niagara River Power Co. and the Cataract Construction Co. for the construction of the tunnel, which is to be completed before Jan. 1, 1892. The Construction Co. numbers among its promoters such well-known men as W. K. Vanderbilt and members of the banking house of Drexel, Morgan & Co., while the engineers are Albert H. Porter, Coleman Sellers and Clemens Herschel.

The power company has purchased about 1,300 acres of river front and has laid out a method of doing the work necessary to the exploitation of its tunnel, in accordance with the plans of the late Thomas Evershed.

Mr. Evershed's plans include the location of a town plat along the banks of the river, with arrangements of lots, streets, mill races and wharves. The streets are to be laid out at right angles to the river and between it and the tracks of the New York Central Railroad. Every other street is to be wide enough for a raceway and the usual wagon traffic, while the intervening streets will be wide enough for railroad tracks, etc. There are to be cross tunnels above the main tunnel, and so drained that they will be accessible for examination whenever the mills emptying into them are not running; the same is to be true of each individual wheel-pit.

This is a general outline of the plan that is to be followed. The estimated cost of the tunnel is put at \$2-500,000, and the company has already acquired a right to property along the river front valued at \$750,000.

In the location of the plant Buffalo is not touched. The upper end of the tunnel is several miles below the city, and apparently that place is out in the cold. But the promoters are aware that there is a consumption of some 40,000 horse power in that city, and they propose

to transmit power by electricity to Buffalo to be used in lighting and manufacturing, and in this they are said to have secured the services of Mr. Edison.

The tunnel passes under Niagara village, and it will discharge into the river below the State Park and beneath the surface of the stream. The factories will only commence at Port Day, at the upper end of the state reservation and at such a distance from the first breakers of the Canadian rapids that navigation will be possible for all manner of steam craft.

Warehousing Rolling Stock.

The novel enterprise of the American Equipment, Storage & Warehouse Co. has been mentioned before in these columns. Heretofore its business has been carried on in rented premises. The company has now secured about five acres of land on the line of the New York, Lake Erie & Western at Lakeview Station, near Paterson, N. J., and storage tracks have been laid and buildings have been and are being erected. The project is to store, insure and otherwise care for, rolling stock of all sorts. Arrangements are made by which locomotives, passenger and street cars can be stored under cover, while freight cars and like equipment will be stored on uncovered tracks. The equipment received will be stored at a certain fixed monthly rental, which covers insurance, and negotiable warehouse receipts issued against it. Either old or new equipment will be taken at an agreed valuation. The company offers to act as a clearing house for builders and for dealers in locomotives, cars, rails, etc., to store and insure their product and to deliver to the purchaser when payment is made. They also propose to store, subject to order, equipment manufactured and awaiting delivery. Inasmuch as warehouse certificates are issued against all material stored, the capital invested in stock which cannot be promptly delivered, for one reason or another, becomes available for use. This also will probably be found a convenience by firms manufacturing for stock during dull seasons. The storage capacity is for 300 pieces of railroad equipment. There are a main storage building 160 x 300 ft., and the necessary shops for repairs. It is proposed to sell on commission or otherwise through the American Car & Equipment Co. The latter company undertakes to supply complete trains of passenger cars; also mining outfits, contractors' and construction outfits, and special equipment of various sorts. It also undertakes to arrange contracts for building new equipment and to arrange car trusts on various bases, as desired.

Production and Consumption of Pig Iron.

There are so much labor and transportation dependent on the manufacture and use of pig iron that very general interest is felt in our output for the first two months of the new year, and the steady increase in furnace capacity since July last is extremely gratifying. The returns of the *American Manufacturer* show that 342 furnaces were in blast on March 1, with a weekly capacity of 179,830 tons, as against 339 furnaces with a capacity of 175,132 on February 1, and 311 furnaces with a capacity of 142,734 tons on March 1, 1889. The probable production for this year has been for January 773,937 and for February, 709,524, an approximate total of 1,483,461 tons. Compared with the production of the first two months of last year, 1,168,615 tons, we have an increase of nearly 27 per cent. The increase of 1889 over 1888 was 17.2 per cent. If we continue our production at its present rate throughout the year, we shall make over nine million gross tons; this will be an increase on last year's production of 20 per cent., or of 41 per cent. over the production of 1888.

The question of interest to freighters, producers and others is, Can this country consume the possible, if not probable, make? Can it, after absorbing 1,114,787 tons more in 1889 than in 1888, take an additional dose of a million and a half tons? There are a great many considerations governing any reply to the question, but they may be classed under two heads—price and demand.

The price of No. 1 Anthracite, according to Mr. Swank, varied through 1889 from \$18 in January to \$17 in May, and \$19.25 in December; the average of the monthly rates having been \$17.67. For 1878, by the same authority, the price was \$17.62, the lowest price ever before received for a year. So far this year the price of No. 1 Anthracite at Philadelphia has varied from \$20.25 to \$17, the last price on the 12th inst.; the average was about \$19.70. Buyers, however, are holding back, and it does not seem probable the price can be held at or near \$20 with the present production. As the average of the prices for the last five years has been \$19.06, it does not seem that the cost of pig iron will interfere with the demand.

So far there seems no indication of reduced consumption, but the continuation of the demand depends on the general confidence in the future. One great source of demand for pig iron has been for steel rails. In 1887 this country, not allowing for waste in manufacture, absorbed 32 per cent. of our make; in 1888, 21 per cent., and in 1889, 19 per cent.; the mileage of new roads for last year having been the smallest since 1885. It is almost impossible that the mileage built this year should not be increased, and as nearly all roads are increasing their net earnings,

It is probable renewals will take much more than last year even, when they probably absorbed about two-thirds of our rail consumption.

It is also pretty certain that our construction of iron ships, which was at its lowest in 1886, will be greater this year than ever before. As each gross ton of iron or steel shipping requires about six-tenths of a ton of iron in some shape, there will be an increased consumption from this cause also. Our exports of iron and steel, crude and manufactured, increased in value for the last two calendar years from about 19½ million dollars to nearly 23½ millions, and our exports of agricultural implements from 2½ to 4½ million dollars; the two items showing an increase of nearly 25 per cent. But it is not probable that these three sources of consumption will increase, appreciably, over the assumed increase of production, and the great reliance for sufficient consumption to justify a make of nine million tons must lie in the confidence of the public in the future.

Everything looks promising in this direction for a largely increased demand for iron: new mills and factories, and warehouses building, and the projected elevated railroads will not only take a great deal of iron directly, but will call for a large incidental consumption; so that, unless something should occur to change the foreseen course of business, it seems probable that we shall offer a market for fully nine million tons of iron.

TECHNICAL.

Locomotive Building.

The Alabama Great Southern has just received two new freight locomotives from the Baldwin Locomotive Works.

The Columbus, Shawnee & Hocking Valley has awarded the contract for the construction of six 47-ton freight locomotives to the New York Locomotive Works.

The Cairo Short Line has just received three 10-wheel Baldwin freight locomotives.

The Cleveland, Cincinnati, Chicago & St. Louis has placed an order for ten large passenger engines, to be delivered in May and June. These engines will have 18 × 24 in. cylinders, 5½ ft. driving wheels, three pairs of drivers, and a 36 in. wagon-top boiler. The fire-box will be 100 in. long by 42 in. wide.

The Lehigh Valley has recently completed a new passenger engine at its Hazleton shops, from designs by David Clark, Master Mechanic. The locomotive has 20 × 24 in. cylinders and 5 ft. 8 in. drivers. It weighs 107,672 lbs. The weight on the drivers is 76,832 lbs., and on trucks 30,240 lbs.

Car Notes.

The Pacific Short Line has closed a contract for building 400 freight cars with the Missouri Car Foundry Co., of St. Louis. Two hundred will be box cars and 200 platform cars.

The Duquesne Traction Co., incorrectly called the Pittsburgh Traction Co., last week, has let the contract for building 100 passenger cars for its electric road to the Pullman Car Co. The cars will have six-wheeled trucks.

The Lehigh Valley is building 10 new parlor cars in its South Easton shops. They are 60 ft. long, and have a seating capacity of 27 chairs. The smoking compartment seats 10.

The Union Pacific and the Chicago & Northwestern have just put in service 400 freight cars, equipped with air brakes, and having a capacity of 50,000 lbs. The cars are owned jointly.

The Hannibal & St. Joseph is building 333 box cars at its own shops, which will have Janney couplers and air brakes.

The 500 freight cars for the Buffalo, Rochester & Pittsburgh, referred to last week, are to be equipped with the Schoen coupler and drawbar.

The Chicago, St. Paul, Minneapolis & Omaha is building three chair cars and 25 refrigerator cars.

The Kansas City, Fort Scott & Memphis has ordered a number of new passenger cars, which will be furnished with the Scarritt reclining chair.

The employees of the Harris car works, St. John, N. B., now on strike, number about 200. Manager Robertson offers ten per cent. advance in wages, but will not consent to nine hours a day. The men hold out for the latter.

The Atlanta Car Co. is having the plans for its proposed buildings drawn. The site for the works has been chosen and the grading of the grounds will soon begin. The orders for the iron and wood working machinery will be placed at once. J. C. Peck, of Atlanta, Ga., is President, and J. G. Healey is Secretary and Treasurer.

Bridge Notes.

The Mayor of Waco, Tex., has recommended the construction of a bridge over Waco creek at Jackson and Sixteenth streets.

The iron bridge over Stone's River, on the Lebanon branch of the Nashville, Chattanooga & St. Louis, has been completed, and the force working on it has been transferred to the Johnsonville bridge across the Tennessee River, to replace two spans that were destroyed by the recent storm.

Two more bridges are to be constructed at Pineville, Ky., in addition to the four iron structures now building.

The Red River Bridge Co. has been incorporated by B. F. Colbert, J. B. Munson, W. B. Newman, and others to build a bridge over the Red River, at Denison, Tex. The capital stock is \$40,000.

The abutments are nearly finished for the two iron bridges to be erected at Salem, Va., across the river by the Pittsburgh Bridge Co., for the Salem Development Co. One of the bridges will be near the freight station and the other at the foot of Colorado street.

The City Engineer, of Harrisburg, Pa., has awarded the contract for building the Mulberry street bridge across the Paxton Creek and meadows to Dean & Westbrook, of New York, at their bid, \$64,750.

A bill is before the Kentucky Legislature to authorize Whitley County to erect bridges in that county over the Cumberland River, Clear Fork River and Jellico Creek.

The Park Commission of Brooklyn, N. Y., has decided to build a new granite and iron bridge in Prospect Park.

The contract for the construction of the McCullam Street Bridge, at Philadelphia, Pa., has been awarded to Levering & Garrigues, of Philadelphia, Pa., for \$42,640.

The contract for building the new bridge at Warren, R. I., has been awarded to the King Iron Bridge Co., of Cleveland, O. The bridge is to be a high-truss swing bridge and is to be 136 ft. long and 32½ ft. wide. The substructure is to be of heavy granite and the superstructure of wrought iron. It is to be completed by Aug. 15.

Ernest Groesbeck and M. J. Verdery, of New York City; W. H. Cozart and others, of Augusta, Ga., have purchased a tract of land opposite Augusta, and contemplate the construction of an iron bridge across the Savannah River.

The bill to authorize Dorchester and Wicomico counties to build a bridge over the Nanticoke River at Vienna, Va., has passed the state legislature.

The Chesapeake & Ohio has just completed an iron bridge at Jackson River depot, Va.

The county of Brant, Ont., is to build a new bridge across the Grand River at Newport, to cost \$10,000.

W. S. Summers and Henry Brown, Civil Engineers, under the instructions of C. K. McDermott, are making preliminary surveys at Charleston, W. Va., for the iron truss bridge across the Kanawha River, to be built by the Charleston & South Side Bridge Co. It will cross the river probably at either Hale or Broad street. The contract will be let this month.

F. J. Reinhard, Columbus, O., Auditor of Franklin County, will receive proposals until April 30 for two bridges, one to be built over the Olutangy river at Lane avenue, in Columbus. The superstructure will be of steel with a 400 ft. span, and a 24 ft. roadway. The bids will be received for the substructure and superstructure separately. The second bridge will be across the Scioto river. The superstructure will be of steel with a 300 ft. span, a 24 ft. roadway, and two sidewalks 6 ft. wide each.

The reorganization of the Shiffler Bridge Works, mentioned some time since, took effect last week, when the works passed under the control of the Shiffler Bridge Co., which has been capitalized at \$300,000. The management remains unchanged. J. W. Walker becomes President and General Manager; F. L. Geist, Vice-President and Treasurer, and C. D. Marshall, Secretary. Among recent contracts taken by these works are bridges on the Chicago, Milwaukee & St. Paul; and Pittsburgh, Cincinnati & St. Louis; a viaduct approach to the Newport & Cincinnati bridge at Cincinnati, and the iron roofing girders, etc., for the Metropolitan Opera House at St. Paul, Minn.

The contract was let this week for the Platt street wrought iron deck bridge at Rochester, N. Y., to the Rochester Bridge Works for \$118,000. The bridge will consist of five riveted, latticed girder spans, supported by four iron trestle piers and two masonry abutments. The total length of the bridge will be 558 ft., with four spans of 158 ft. each, one span of 126 ft., and four pier spaces of 25 ft. each. The width of the carriage-way will be 22 ft. and the white oak planking 3½ ins. The two sidewalks will each be 8 ft. wide.

The following were the estimates for the work: Excavation, 882 cu. yds.; first class masonry, 632 cu. yds.; second class masonry, 1,069 cu. yds.; concrete, 97 cu. yds.; iron, 1,538,837 lbs.; white oak plank, 72,991 ft.; white pine plank, 41,245 ft. The bridge is to be completed by Nov. 30.

A bill to incorporate the Niagara River Bridge Co. has been introduced in the New York State Senate. The incorporators are: Peter A. Porter, William B. Sirrett, Joseph E. Ewell, James H. Ross, of Buffalo, and Frederick A. James and C. B. Gaskill, of Niagara Falls. The bill authorizes the construction of a railroad bridge across the Niagara River between the reservation at the Falls and the old suspension bridge, near Lewiston. The capital stock of the company is to be \$500,000, and may be increased to \$2,000,000. The company may issue bonds, not to exceed \$2,000,000.

A bill has been introduced in the House of Representatives to incorporate the Georgetown Union Bridge Railway Co., of the District of Columbia. Among the incorporators are G. G. Boteler, J. E. Clements, of Virginia; and Outerbridge Horsey, of Baltimore. The bill authorizes the company to build an iron railroad bridge on the piers of the present free bridge or aqueduct bridge. The bridge is to be constructed under the roadway of the present bridge, and to rest upon the old aqueduct piers, on the inside of the present superstructure. The capital stock is \$300,000.

Manufacturing and Business.

Robinson & Orr, of Pittsburgh, have removed their offices to 419 Wood street. In addition to its iron and steel department, the firm has added an investment department, which will be in charge of Robert A. Orr. A specialty will be made of bonds, mortgages, iron mining stocks and local securities.

The Carolina Oil & Creosote Co., of Wilmington, N. C., has nearly rebuilt the portion of the plant recently burnt. The oil plant is to be enlarged as the output does not meet the requirement of orders. The contracts for creosoted piles and lumber now on hand approximate \$50,000, and orders are increasing rapidly. The principal orders for creosoted materials are as follows: Piles and timber for the Nicaragua Canal Co., to be used in building a pier and breakwater at Greytown. Piles for the Southern Construction & Quarry Co., engaged in building the custom house wharves in Charleston, S. C. Lumber for the under ground electrical conduits in Philadelphia. About 350,000 ft. of timber for the new long bridge at Chattanooga, Tenn., being built by the Smith Bridge Co. Piles and lumber for the United States Life Saving Station at Humboldt Bay, on the Pacific coast, near the Oregon boundary—to be shipped by rail to San Francisco. Timber for the new United States government dry dock, now under construction at the navy yard at League Island.

Charles H. Davids, who has carried on a successful business at 106 Liberty street, New York City, as engineer, machinist and foundryman, has transferred it to the Davids Machine Works, which has been organized to conduct it. W. H. Humphrey is President of the new company and C. H. Davids Vice-President and General Manager. The change was made necessary by an increasing business, and to enable Mr. Davids to devote more attention to the mechanical branch and relieve him of the financial details. In addition to the shop at 106 Liberty street, the premises at 75 Centre street have also been secured, and will be operated in connection with the Liberty street shops.

The new shops of Riter & Conley, of Pittsburgh, will be erected at Superior Station, and ground has been broken for them. They will be used for the structural iron branch of the business. The plant will consist of two combination wood and iron buildings, one of which will be 46x162 ft. and the other 72x306 ft. In the latter will be erected six hydraulic cranes for handling material. All the work pertaining to the blast furnace business will be conducted at the Pittsburgh shops.

The Morris Machine Works, of Baldwinville, N. Y., have lately built sand and steam dredging pumps for the Illinois Steel Co. and the Bucyrus Steam Shovel & Dredging Co. The entire plant is running 18 hours a day.

The Babcock & Wilcox Co. has designed a new boiler to be used for large plants. A 1,100 H. P. boiler of this type has been sold to the Cleveland City Cable railroad for its new road. Other orders have been from the Isabella Furnace Co., 500 H. P.; and Woodland Fire Brick Co., of Pittsburgh, 92 H. P.

The plant of the Northwestern Malleable Iron Co., in Milwaukee, Wis., was damaged by fire last week to the extent of about \$45,000.

The Michigan Railway Supply Co., of Detroit, has orders from the following roads for the Central steel brake beam; Michigan Central for 500 60,000-lb. box cars; Atchison, Topeka & Santa Fe for 100 furniture cars; Chesapeake & Ohio for 1,000 50,000-lb. cars and Cleveland, Cincinnati, Chicago & St. Louis for 1,000 50,000-lb. cars. Small orders have been received from the Duluth, South Shore & Atlantic, Kansas City, Fort Scott & Memphis and Connecticut River roads.

Iron and Steel.

The Swindell & Smythe Co., of Pittsburgh, has been awarded the contract for erecting the berding and welding furnaces for the new plant of the Tyler Tube Co. at Washington, Pa. Work has already been commenced.

The Allentown Rolling Mills have been shut down temporarily. Eleven puddle and five heating furnaces in the beam and bar mill were running all winter.

William Tod & Co., of Youngstown, O., are building for the Illinois Steel Co., of Chicago, eight large rail straightening presses.

The rolling mill of the Johnson Forge Co., at Wilmington, Del., was destroyed last week, with much machinery. The forge mill and five puddling furnaces were saved. The company manufactured car axles, and 100 men are thrown out of work by the fire. The loss is about \$10,000, insured.

Furnace three of the DeBardeleben Coal & Iron Co., at Bessemer, Ala., was blown in last week. The fires were lighted by Vice-President Milton H. Smith, of the Louisville & Nashville. The rolling mill of the Elyton Land Co., at Birmingham, has been blown in.

The Lewis Foundry & Machine Co., Limited, of Pittsburgh, has under construction a 60-ton hydraulic crane for the new open-hearth department of the Pennsylvania Steel Co., at Steelton, and a five ton Aiken hydraulic crane for the Columbia Iron & Steel Co., at Uniontown, Pa. In addition to roll trains recently furnished to the Pennsylvania Bolt & Nut Co., at Lebanon, Pa., it is now building for that firm a three high puddle mill and an engine 28 × 48 to drive it, and an overhead geared squeezer, with 17 × 24 engine.

The Rail Market.

Steel Rails.—Pittsburgh mills have orders from the Chicago, Burlington & Quincy for 14,000 tons, and from the Atchison, Topeka & Santa Fe for 10,000 tons. The quotations are: Eastern mills, \$34 at mill; Pittsburgh, \$33½ at mill; Chicago, \$35 at 36.

Old Rails.—In the East foreign double heads are offered at \$26.50, and tees are nominally \$24.50. At Pittsburgh quotations are nominally \$24 for old iron rails, and \$21 @ \$22 for old steel rails.

The Brooks Locomotive Works.

The Brooks Locomotive Works, of Dunkirk, N. Y., have recently shipped 73 locomotives to various roads. This number includes the following orders: Twenty 18x24 ten-wheel and ten 18x24 six-wheel switching, to the Cleveland, Cincinnati, Chicago & St. Louis; ten 18x24 ten-wheel, two 18x24 six-wheel switching and five 18x24 passenger, to the Baltimore & Ohio Southwestern; two 18x24 six-wheel switching to the Chicago, Rock Island & Pacific; ten 18x24 passenger, to the Chicago & Grand Trunk; ten 18x24 moguls, to the New York, Chicago & St. Louis, and three 15x20 moguls, to the Au Sable & Northwestern and a heavy passenger engine, the first of an order, for the Vanegas, Cedral & Rio Verde, of Mexico. Among the engines that the firm is now building are the following: ten 18½ × 24 heavy 10-wheel passenger engines for the Cleveland, Cincinnati, Chicago & St. Louis; ten 18 × 24 heavy 10-wheel passenger for the Wisconsin Central; twenty-five 17 × 24 10-wheel freight for the Lake Shore & Michigan Southern; twenty-five 19 × 26 heavy mogul freight for the New York Central & Hudson River road, and fifteen 18 × 24 six-wheeled switching for the Illinois Central. The works are now turning out four and five locomotives per week. When the new hydraulic plant is completed and the new machinery now being received is put in position and in full working order, a locomotive of the heaviest type can be turned out complete every working day.

Riehle 200,000-lbs. Testing Machine.

Messrs. Riehle Brothers have recently sent out illustrations and a description of a patented vertical screw power testing machine of 200,000 lbs. capacity. It is a substantial and handsomely designed machine, and combines all the latest improvements as to the variety of speeds for testing and returning testing tools; also several different appliances for the straining tests, specimens by tensile, transverse and compression strains. The total weight of this machine is over 10,000 lbs. It is 11 ft. long, over 8 ft. high and about 4 ft. wide. Specimens from 8 in. to 24 in. in the clear length of breaking sections, and of 2 in. in diameter and less, can be tested by tensile strain. Specimens for transverse testing can be made 2 ft. long down to 12 in. or less by special appliances to almost any reasonable length. The compression tools are 8 in. in diameter. The motion of pulling the head is 30 in. This testing machine has eight speeds; two adjusting speeds and six different speeds by which a specimen can be stretched or broken, also for driving in opposite directions.

Upon this machine strains can be determined from 10 lbs. up to 200,000 lbs., and by the use of the patented vernier poise all the weights can be registered on the beam or any part as may be preferred. By different appliances many varieties of special forms of material

can be tested very accurately, even though they may be subjected to a great strain. In this machine is used the Riehle patented high-faced wedged grip, by the use of which it is claimed that flat specimens of material, such as boiler plates, etc., can be tested in a direct line through the centre of specimen and without the possible tendency to tear from the edge. The high-faced wedges engage themselves first through the axial line of specimen and from that line out.

Brakes in India.

Of course the reader remembers that a so-called trial of brakes in India resulted in an order for a considerable equipment of the automatic vacuum for the state roads. A recent issue of *The Indian Engineer* says: "An undertaking to produce a form of vacuum brake capable of working upon as long a train as that controlled by the Westinghouse brake was held out by the agents of the Vacuum Co., but since the brakes which are now being sent out are those of the antiquated type, the inability of the Vacuum Co. to do more than promise a long train brake may be taken for granted."

Automatic Couplers and Brakes in Iowa.

The bill drawn by Mr. Coffin for the introduction of safety appliances on the roads of Iowa has been passed and has become a law in that state. It requires that all new cars and those undergoing general repairs shall be fitted with the automatic coupler; also, that all other cars shall be so equipped by January, 1895. It provides that all locomotives shall be equipped with driver brakes by January, 1892, and that by January, 1893, enough cars shall be equipped with power brakes to enable engineers to control freight trains. It allows railroads to haul foreign cars not so equipped, if engaged in interstate traffic.

Double-Screw Ferryboat.

Neale & Levy have been awarded a contract by the New York, Lake Erie & Western for a double-screw ferryboat, with a propeller at each end, to cross the North River between New York City and Jersey City. The new boat will be 230 ft. long, 38 ft. beam and 62 ft. width over the guards and 16 ft. depth of hold. The engines will be of the compound type. This will make the second ferryboat of the design yet built, the other being the "Bergen," built a short time ago at Newburg by T. S. Marvel & Co. for the Hoboken Ferry Co.

Ties of Wood and of Iron in Germany.

The following table give the number of ties of wood and iron put down in Germany in various years:

Year.	Ties, millions.		Proportions per cent.		
	Wood.	Iron.	Wood.	Iron.	
Prussian state	1885-86	1,507	0.627	69.16	30.84
railroads	1886-87	1,583	0.522	75.18	24.82
	1887-88	1,654	0.494	77.02	22.98
All German	1885-86	2,492	1.007	70.97	29.03
railroads	1886-87	2,545	0.868	74.56	25.44
	1887-88	2,677	0.750	78.10	21.90

The Cumberland Gap Tunnel.

This tunnel on the Knoxville, Cumberland Gap & Louisville Railroad is fast approaching completion. There are now about 150 ft. of the bench unremoved. The tunnel is 3,587½ ft. long, all of which, except 150 ft., is now ready for the track. The approaches to the tunnel on each side are 150 ft. in length; these approaches are in cuts 70 ft. deep at the mouth of the tunnel on one side and 90 ft. deep on the other. On the Kentucky side a vein of fine coal, 5 ft. thick, was passed through. The coal has been used by the contractors. The total length of tunnel and approaches is over 4,000 ft., with a very high trestle on the Tennessee side, 300 ft. long, adjoining the approach.

Free Instruction in Road-making.

The Case School of Applied Science, Cleveland, Ohio, will give, free of charge, instruction in road engineering sufficient to qualify a man of ordinary intelligence to properly locate and manage a highway. The instruction will consist of lectures on the following topics: Location and construction of roads; keeping up and repairing roads; ditching and drainage; road making and machinery; improvement of the surface of roads, including the use of gravel, broken stone, plank, paving, etc.; highway structures, including retaining walls, culverts, bridges, etc.; cost of earthwork and mechanical structures; highway administration, and laws relating to highways. For those who desire it, instructions will be given in the use of instruments employed in road engineering—the compass, transit and level—and in drawing plans, plans and profiles. Besides the instruction given by the professors of Case School, practicing engineers of wide experience will give lectures on special topics connected with road-making. The only preparation needed for the course of instruction is a common English education, such as is given in the district schools of Ohio. The lectures will begin the first Monday in February, 1891, and will continue four weeks. There will be no charge of any kind made by Case School.

Lake Steamers.

James Davidson, of West Bay City, has an order for four 3,000-ton wooden steamers for the Pittsburgh & Western, to be used in the coal and ore trade on the lakes, running from Fairport, O. The boats will be similar to the two built for the road last fall. They are 320 ft. long, 41 ft. wide, and 21 ft. deep at the shoalest part. Exclusive of the fuel the steamers are guaranteed to carry 8,000 tons on 16 ft. draught of water. The guaranteed speed is 13 miles an hour.

Solid Steel Car Bodies.

English journals state that the Leeds Forge Co. is putting in machinery to manufacture solid pressed steel car bodies. The sides and bottom of the car are to be pressed from one plate of steel. The accounts do not give the depth of the sides. From experiments which have been made it has been demonstrated that there will be no difficulty in turning up the sheets without cracks or bad corners.

The Montreal Bridge.

The plans for this bridge, which is to be built across the St. Lawrence River at Montreal, show a structure 70 ft. wide with railroad tracks, double roadways 14 ft. wide each, and two sidewalks 7 ft. wide each. It will begin on St. Catherine street near Fullum, and will be trestle until it reaches Notre Dame street. Iron columns will support the span crossing Dorchester street. At Notre Dame street the main cantilever begins at a height of 105 ft. above the present roadway.

The pier will be south of the Canadian Pacific track. The next one will be flush with the edge of the present wharf. The main cantilever span from the city to Ile Ronde will be 1,300 ft. long, including the two cantilevers of 500 ft. each and a connecting girder span of 300 ft. The height will rise from 150 ft. (the same as the Forth Bridge) to 170 ft. over the ship channel. There will be two piers on the Ile Ronde, 40 ft. square at their base, and provided with cut-waters on the west side to break the ice; they will be 120 ft. apart. The piers beyond Ile Ronde are placed 200 ft. apart until the south shore is reached, the bridge ending beyond the river road at Longueuil. The whole length will be 8,500 ft., and the cost is estimated at about \$3,000,000.

The Nicaragua Canal.

A contract has been signed for building 17 miles of railroad from Greytown to the rock cut at the divide. The contractor, with foremen and assistants, will sail for Greytown April 29. A contract for bridging the harbor at Greytown has also been let, and work will begin the middle of May. Six hundred feet of pier has been built in the harbor. The pier is creosoted and will be 1,700 ft. long when completed. A pipe line, 13 miles long, to bring fresh water from the mountains, is being constructed.

THE SCRAP HEAP.

Notes.

Several passenger conductors of the Pittsburgh, Fort Wayne & Chicago were discharged at Fort Wayne this week.

Three hundred representatives of the various trainmen's brotherhoods gathered at Elmira, N. Y., last Sunday, to consult about federation.

Some brakemen on the Union Pacific at Portland, Or., struck last week for an increase of 10 per cent. in wages. Their demand was granted.

A freight conductor of the Pittsburgh, Fort Wayne & Chicago was fatally shot at Lima, O., last Sunday, by tramps whom he was driving off his train.

Two freight conductors and ten brakemen on the Louisville, St. Louis & Texas struck at Henderson, Ky., last week, because an order was issued requiring one man to be on the outside of the train in bad weather and when passing over bad track. The strikers were discharged.

The verdict of \$90,000 which E. S. Richards secured against the Lake Shore & Michigan Southern was affirmed by Judge Grinnell in Chicago last week, and the court entered judgment for the amount. The company took an appeal. The suit was based on a failure by the road to fulfill a contract with Richards by which it agreed to use Richards' transfer house at Englewood for the transfer of all its grain.

The following bids were received for the work on the foundations for the new office building of the Cleveland, Cincinnati, Chicago & St. Louis in Cincinnati. The bids were for the foundation, including excavation, masonry and concreting: Dennis Flaherty & Bros., \$47,000; H. Meiners & Son, \$43,615; David Hummel, \$42,500; Isaac Graveson, \$41,880. The lowest bidder received the award.

Mr. A. Hale, of the office of the Superintendent of Transportation for the Pennsylvania Railroad, sends to the *Equipment Guide* a list of arbitrary abbreviations which he proposes for use in car record offices to save time in writing initials of cars. No one of his signs contains more than two letters or figures. We quote a few samples: B, Baltimore & Ohio; B S, Baltimore & Ohio Southwestern; B U, Chicago, Burlington & Northern; C, Central of New Jersey; N, New York Central & Hudson River; N J, New Jersey & New York; C I, Chicago & Alton; C 2, Cleveland & Canton. It is estimated that the initials of roads have to be written in car record offices 100,000 times per day.

The damage to the Union Depot at Louisville, Ky., by the tornado of March 27, was upward of \$50,000. A new train shed is to be built by the Phoenix Bridge Co., of Phoenixville, Pa. The draw span and one of the fixed spans of the Cumberland River Bridge were demolished by the storm. The Louisville Bridge Co. has the contract for making the repairs on this bridge. Several hundred feet of trestle work on the Chesapeake & Nashville were destroyed, and it is reported that this road lost two iron bridges, but their location is not given. The Directors of the Louisville & Nashville contributed \$10,000 to the relief fund at Louisville, and employees of the road subscribed \$1,712 in addition to this.

Reorganization of the Corinth Canal Company.

This company, which suffered a collapse shortly after the failure of the Panama Canal, is to be reorganized by transferring the enterprise from the present bankrupt company to a Greek company, recently formed for the purpose, with a capital of £200,000. There seems to be a strong national feeling back of the new company, the National bank and the leading credit institutions of Athens taking a great interest in the success of the new project.

Probably Fiction.

A correspondent writing from Utah to a Chicago paper tells the following incident, which is said to have occurred on the Central Pacific: "Some friends of mine were in a Pullman next to the locomotive when a collision occurred that turned the car over on its side and demolished the two ends. My friends were in the centre, and were unhurt, but had to be taken out of a window. At one end there hung a cage with a parrot; the cage was broken, but the parrot was unhurt, and got out of the car when the others did. Of course, it was a shock to the ladies and caused great confusion, but in the midst of it what did they hear but the parrot saying: 'What in the h—l will happen next?'"

Respectfully Referred.

The fact regarding claims against railroads is that, as a rule, it is next to impossible to collect them. Gross overcharges have been made right along, and the victimized parties have submitted, rather than fight a railroad. If a claim is presented, no matter how equitable, it has to go through a lot of red tape before it has passed along, which wears out a man's patience, and where there

is any ground for contesting a claim it will be collected only at the end of a long and expensive law suit. Under such circumstances the ordinary shipper or receiver of freight has a poor outlook, and is likely to put up with repeated injustice rather than incur a lot of worry and expense, with the chance of being beaten anyhow.—*Northwestern Lumberman.*

A Little Item of \$100,000.

The irresistible tendency to increase the weight of rolling stock is necessitating increased strength and cost in respect to many other appliances. For example, track scales which formerly had a capacity of 30 tons and were 30 ft. or less in length are now inadequate for handling freight cars 34 ft. and more long and carrying loads of 30 tons or more, and the roads are now replacing the 30-ton and 40-ton scales with those able to carry 60 tons. This involves a very considerable item of expense, as the cost of putting in the largest track scales is not far from \$1,000 each. The Chicago & Northwestern uses about 100 track scales, so that replacing the old ones with the largest means an outlay of something like \$100,000.—*Railway Age.*

The Strong Locomotive Works in Cincinnati.

Cincinnati papers gave a bird's-eye view and plan of the site and buildings of the Strong Locomotive Works. The buildings are very handsome, and presumably well arranged and commodious, and cover nine acres of ground. "They can be extended indefinitely without breaking the systematic arrangement of the whole, but as at present designed they will have a capacity of a finished locomotive every nine hours, or, if worked double turn, two locomotives a day." It is proposed to build not only the Strong locomotive, but those of any other design. The fact that the buildings have not yet been erected makes it easier to extend them indefinitely and does not lessen the beauty of the illustration. It is said, however, that 1,350 acres of land have been bought at an aggregate cost of \$357,000.

The Hudson Bay Railroad.

A dispatch from Ottawa says that the Canadian Government has decided to guarantee the interest on \$5,000,000 of the bonds to be issued by the Winnipeg & Hudson Bay Railway & Navigation Co. for the construction of that road. Hugh Sutherland, President of the company, and representatives of the British capitalists who are ready to put their money into the scheme, are at Ottawa completing the arrangements. The bill to guarantee the interest on the company's bonds will undoubtedly be passed at this session, and work will be resumed as soon as the weather will permit. There is a bill now pending in the Manitoba Legislature granting a subsidy of \$750,000 for the building of a part of the road which passes through that province from Winnipeg northward.

Boston Gossip, per Associated Press.

The New York, New Haven & Hartford, having completed its transfer steamer, the New England Washington night express which, since the old Maryland was burned, has gone via Newburg and the Erie to Jersey City, will on April 20 resume running by the way of the Harlem River, and the report is current that the Old Colony will simultaneously put on a Washington train, to use the same route from New Haven southward, but to run in the daytime. Renewed charges of discrimination in the matter of freight traffic are made by the New York & New England. It is claimed that freight from New York to Boston by the N. Y. & N. E. is started at more favorable hours and run faster than that which goes over the N. Y. & N. E. The New England and its rival are also squabbling before the Railroad Commissioners over the right to build a short branch in Norfolk County, which each thinks can be made to injure the other.

Graceful Gift-giving.

The Cincinnati, Hamilton & Dayton has presented John Sander of Tippecanoe, O., with a gold watch and chain as a testimonial of the company's appreciation of his heroic act, at 3 a. m., on the 25th of February, when he forded a stream where a bridge had been swept out and signalled train No. 1 in season to prevent what probably would have been a serious disaster.

The Louisville, New Orleans & Texas has presented to Charles Robinson, colored, of Warrenton, Miss., a very handsome silver pitcher, inscribed, "Charles Robinson, meritorious services, Jan. 14, 1890." Robinson on the night of Jan. 14, found a stock car on the main line at Warrenton, where it had been blown off the side track by a high wind. Knowing that a freight train was due he flagged it and thus averted a serious collision. The handsome gift was accompanied by a letter of thanks, and, says a local paper, if Robinson is not the happiest darkey in the land when the two reach him, his gratification will be at least be very near high water mark. Several handsome pieces of plate presented to persons on the southern division, and now treasured by them, are evidence of similar action by the company heretofore.

The Chicago Railroads and the City.

Specifications relating to the proposed fencing and other protections to be put up by the railroads under the new speed ordinance have been decided upon by the Mayor and Commissioner of Public Works of Chicago. Extracts follow: Railroad companies may at their own option construct walls of stone or brick, or picket fences of iron, oak or pine, in no cases less than 7 ft. high from the surface of the ground. If a picket fence be constructed of wood, the width of the pickets shall not be less than 2½ in., and the space between the pickets shall not exceed 4 in. Upon certain local conditions the height of the fence may be reduced, or a solid board fence may be adopted, or a fence may be constructed of woven wire or of "expanded metal," or a single or double line of barbed wire may be strung along the top of such fence; but no line of barbed wire shall come nearer than 6 ft. from the surface of the ground or sidewalk. In every case when the local conditions shall in the opinion of the Mayor and the Commissioner of Public Works justify an omission of a wall or fence, a plan or sketch warranting such omission, with reasons stated therefor, shall be submitted to and approved by the Mayor and the Commissioner of Public Works.

Whenever any railroad company shall raise its tracks to a sufficient height to permit subways under street crossings, then in that case the construction of said subways shall be held to be in lieu of fences of any kind along the line of the railway tracks so raised.

The railroad company acting under this permit is re-

quired to proceed at once and continue to complete the protections without delay.

Each railroad company shall assume all responsibility as to relative location of fences and protections to the tracks. All work shall be subject to the approval of the Mayor and Commissioner of Public Works.

Points for Experts in Competition.

A Chicago paper reports that competition in passenger rates between Joliet and Chicago is very lively. The "fine new depot" of one road attracted so much trade that another company had to reduce fares materially. The original aggressor then took off about 60 per cent. The scalpers here took a hand, and people who had pressing business at home neglected it so as to favor the roads by filling their passenger cars. At last accounts all parties to the fight were running sleeping cars on day trains and furnishing three bath rooms to each berth. The road which, in addition to furnishing a free circulating library hired an elocutionist to read to the passengers in tones sufficiently loud to keep them awake was at last accounts rapidly scooping the cream of the trade. But for genteel and dignified appeals by which to beguile the unwary passenger, these uncultured Western roads might well take pattern from the classic elegance of the advertisements of the dignified Pennsylvania, which gives its patrons gems from the poets in lavish profusion, and sets forth the merits of its "Pennsylvania limited" in a folder whose artistic elegance was never before equaled beyond the precincts of Fifth avenue. The smoking cars of this train have "glorious lounging seats," and "quiet nooks and corners." The latter invite the seclusion of the Adirondacks. There is a "plunge bath for men," and the floor of the car is sufficiently strong to preclude all possibility of striking one's head on the track. The beauties of nature witnessed during the passage through the Allegheny Mountains are not allowed to escape in their evanescence, but are instantaneously photographed on the plate glass windows, where their enchanting loveliness will be fixed to the end of time. The ladies' maid is both "gentle and experienced," and we are further informed, in another paragraph, that she is "colored," but whether pink, yellow or black is not stated. To cap the climax, the paper furnished on the writing desks of this home-like train is "linen," but whether Crane Brothers' water-mark can be seen, right side up, on every sheet, is another point on which we are left in ignorance. It pains us to observe that this gorgeous folder makes no mention of the stenographer and typewriter. As this official does not travel west of Pittsburgh, we suppose the benighted travelers west of that city are still slaves to the antiquated steel pen.

The Channel Tunnel.

At a general meeting of the Channel Tunnel Co., held recently, to receive a report upon the present condition of the works, and to issue further instructions, Sir E. Watkin, M.P., who presided, said the report they had to present was as follows: "As the members will have seen by the publication of the report of their engineer, Mr. Brady, the borings intended to ascertain the exact nature of the stratifications beneath the floor of the Channel have been a success. A seam of coal of good bituminous character was reached at 1,180 ft. from the surface, and extended for a thickness of 3 ft. 6 in., with a 4 in. parting of shale and sandstone in the middle. The borings have been thus far hopeful. Your directors recommend you to permit them to continue the borings for another 1,000 ft. if necessary, with a view to thoroughly and absolutely ascertain the commercial value of these hitherto unascertained mineral resources. Should your further researches prove as encouraging as those already completed, there would of necessity be great commercial advantages attendant upon your discoveries. Your directors propose to put down more powerful machinery and to use diamond drills in pursuit of those further discoveries, so vitally affecting the future history and proceedings of an improved means of communication across the Channel. All the probabilities are in favor of this find, which, geologically, was perfect, being commercially excellent, profitable to a large degree to this country, and he hoped to the long-suffering shareholders in the Channel Tunnel Co. The present government considered it was a positive sin to think of being able to transport themselves or their merchandise from this side of the country to France, except by going over the surface of the sea. Were the shareholders really to risk about 6d. a share more finally and absolutely to prove this great question? If they found other seams of coal, and perhaps petroleum—for of that there were indications—then the shareholders would improve their position. He moved the adoption of the report, and a resolution authorizing the directors to proceed with the explorations. Referring to the opinions adverse to the tunnel scheme, he asked was the military fate of this country safe in the hands of the illustrious Duke, the Commander-in-chief and Lord Wolseley? He did not think it was. Any phrenologist would see that their heads were not molded in the shape of Napoleon's. Both of them, no doubt, were gallant soldiers, and were very good for carrying on little wars, but if there was to be a battle of giants, then God help old England! The resolution was then agreed to unanimously.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

In New Jersey the Supreme Court holds that, by the general railroad law of the State, a company organized thereunder may condemn the "located route" of an existing railroad only for the purpose of crossing the same; and where a petition of such a company for the appointment of commissioners shows that it seeks to condemn a part of such a route generally, and not merely for the purpose of crossing, an order made thereon will be set aside. The law does not authorize a company organized thereunder to adopt a plan of crossing an existing railroad which will compel an alteration of its grade in order to its continued operations; but the crossing authorized to be acquired by condemnation is one where the previously existing use of the spot as a railroad continues in co-operation with the use by the new railroad.¹

In Kansas the Supreme Court decides that a notice to the general attorney of a railroad relating to matters connected with its land department, before any action is brought against the company, is not notice to the land department or to the company, unless the general attorney has been given special charge of the subject matter of the notice.

In Illinois the Supreme Court holds that where neither the charter of a railroad company nor any other statute prescribes the rules for locating its stations, mandamus

will not lie to compel it to establish a station and stop its trains at a town on its line at which it has not been in the practice of receiving and delivering passengers and freight, under the Illinois statute of 1877, which provides that all railroad companies are required to build and maintain depots for the comfort of passengers and protection of freight, "where such railroad companies are in the habit of receiving and delivering passengers and freight, at all towns and villages on the line of their roads having a population of 500 or more," though such town has a larger population than 500.²

In New York the Supreme Court rules that the fifth section of the Interstate Commerce act, prohibiting railroads from entering into agreements for pooling freights or dividing their earnings, does not invalidate a contract between two railroads whose lines of road are parallel, by which certain territory is preserved to each, within which it shall prosecute the work of extending its branch lines, etc., though it may prevent certain pooling provisions therein from being operative.³

The charter of the Y. & M. V. R. Co., granted by the legislature of Mississippi, provided that all the property of that company in the state necessary to the exercise of the powers granted, "shall be exempt from taxation for a term of 20 years from the completion of said railroad to the Mississippi River, but not to extend beyond 25 years from the date of the approval of this act." Rev. Code Miss., § 608, in force at the time, provided that no railroad company should be subject to taxation during construction, but that parts of the road completed and operated for profit should be taxed. The Supreme Court of the United States holds that the exemption given by the charter was to begin from the completion of the road to the Mississippi River only, and not during its construction, and that parts of the road completed and in operation before that time were taxable.⁴

Carriage of Goods and Injuries to Property.

In Kansas the Supreme Court holds that a railroad which builds its tracks upon a street of a city in such a way as to render the street wholly useless to plaintiff as a means of access to and from his lots abutting on the street is liable in damages to plaintiff, although the railroad is skillfully and properly constructed, and plaintiff's lots are accessible from another street. And where it laid its tracks upon a street in such a manner as to cut off access to plaintiff's lots abutting on the street, and did not compensate plaintiff for such injury, the company, which purchased the railroad at foreclosure sale, became liable for a continuance of the nuisance.⁵

In Colorado the Supreme Court rules that one who only means of ingress and egress to his lots is by means of the intersection of two public streets, one of which passes in front of the lots, but extends a short distance beyond, can recover of a railroad company for keeping the intersection blocked with cars, so as to interfere with the approach to the lots and injure the rent of the house thereon.⁶

In New York, it is held by the Supreme Court that where a railroad has built a track in a street on which plaintiff's property abuts, permanent depreciation in the value of plaintiff's property cannot be recovered in a common-law action, but he must be limited to a recovery of such temporary damages as have accrued up to the time of the commencement of the action.⁷

In Minnesota it is ruled by the Supreme Court that the owner of a farm consisting of distinct parcels of land, separated by lands not owned by him, and over which he has no private right of way, is not entitled to have such separate parcels treated as one entire tract, for the purpose of the assessment of damages for the taking (for railroad purposes) of land in one only of such parcels.⁸

In Iowa the Supreme Court rules that a railroad carrying whisky consigned by a person without to a person within the state of Iowa, after the expiration of from six to fifteen days from the receipt of the various packages at the point of destination, is no longer a carrier but becomes a warehouseman, and the liquors, if intended for illegal sale, may be seized in its freight depot and confiscated.⁹

In Alabama the Supreme Court holds that in the absence of a custom authorizing the agent of a railroad, at the request of the consignee, after the car has reached its destination, to undertake to deliver at another place, or to another person than the consignee, such an undertaking is nothing more than a personal accommodation on the part of the agent, and cannot render his principal liable. But if the railroad, without further consideration, and though not bound to deliver the car to the other road, does, nevertheless, undertake to do so, and it is shown that it is the custom in such cases to give notice to the other roads, the company will be liable for any damage that may result from its failure to give such notice.¹⁰

In Texas the Supreme Court rules that, under the state statute which declares that "the duties and liabilities of carriers in this state shall be the same as are prescribed by the common law," except when otherwise provided, an interstate carrier, in the absence of contract limiting its liability, is liable for goods destroyed by a mob of rioters.¹¹

In the Federal Court it is held that a bill alleging discrimination and extortion in charges must aver that there are some parties who are charged less than complainant, and that complainant has no other means of carrying on his business than those wherein he is so overcharged.¹²

Injuries to Passengers, Employees and Strangers.

In New York, a passenger, as soon as the train on which he was riding stopped, arose from his seat near the front door of the car and proceeded to leave by that door. When he had placed one foot on the last or lowest step, and was proceeding to step off the car with the other foot, he released his hold of the railing, and the train starting at the same moment with a sudden jerk, he was thrown to the ground, causing the injuries sued for. The Court of Appeals holds the railroad liable.¹³

In Kansas the Supreme Court rules that where a passenger is injured while alighting from a moving train, but there is evidence that he was suddenly awakened out of sleep, and directed by the conductor to get off as soon as possible to prevent being carried beyond his station, and that he thought the train was moving slowly, it is for the jury to say whether he was guilty of contributory negligence.¹⁴

In California the Supreme Court rules that a passenger need not tender the exact amount of his fare, but he must tender a reasonable amount, and the carrier must furnish change, and five dollars is such a reasonable amount.¹⁵

In New Jersey the Supreme Court holds that a genuine silver coin, worn smooth by use, not appreciably diminished in weight, and distinguishable, is a legal tender for car fare; and, if ejected for refusal to make other payment, the passenger may have an action for damages.¹⁶

In Indiana the Supreme Court rules that where the master mechanic in a railroad company's shops, who has full authority over the men, machinery and work, and who is the only representative of the company there at the time, orders a workman to disconnect the equalizer of one of the locomotives, and, while complying with such order, the workman is injured through his negligence, he will not be considered a fellow-servant, so as to relieve the company from liability.¹⁷

In New York a brakeman sued for injuries received by being struck by a bridge while standing on the roof of a freight car while engaged in his work. It appeared from plaintiff's evidence that the bridge was too low for him to pass under it while standing upright, and that he was familiar with the bridge, and was standing with his back to the engine when he knew that the train was about to pass under the bridge. The Court of Appeals holds the railroad not liable.¹⁸

In New York some railroad servants were thawing frozen dynamite cartridges. They had been partially submerged in a pail half full of water, which was placed over a fire in the open air. When the lower end was thawed, the cartridges were turned upside down, to thaw the other end. They exploded, killing a man who had been employed in another branch of defendant's service. The man who had charge of the thawing of the cartridges had never heard that cartridges exploded with heat, and never had any instructions about handling dynamite. One of his assistants, who alone was at the fire when the accident happened, knew nothing about dynamite until a day or two before, when he had been told not to drop the cartridges in the fire. The railroad authority who directed the thawing of the cartridges told the men to be careful, but gave them no instructions. The Supreme Court decides that the work of thawing the cartridges was the work of the master, and that the evidence warranted a finding that through the ignorance of the workmen in charge of this work there was not that reasonable care which defendant owed to those engaged in its service.¹⁹

In Georgia the deceased was walking on the track, though there was a public road alongside, upon which he could have walked; the train, going in the same direction, being 10 or 15 minutes behind its schedule time, was running 25 or 30 miles an hour; the engineer, who could have seen him some 400 yards, gave the danger signal, though it did not appear at what time before the killing. There were two girls on the track, between deceased and the train, who left it when they heard the train, and hallooed to deceased that the train was coming, but he, failing to leave the track, was run over and killed. The Supreme Court holds that he was guilty of gross negligence, though it may have been the custom for people to walk on the track.²⁰

In Wisconsin the Supreme Court rules that a man who drives a team upon a railroad track at a road crossing at night, and continues driving thereon for nearly two miles, where there is nothing to prevent his leaving the track except darkness, is guilty of gross negligence, and no recovery can be had for his death caused by a passing train, though the railroad company maintained the crossing in a negligent manner, and he was not negligent in entering on the track. The fact that he was stupidly drunk would not excuse his negligence.²¹

In a case in the Federal Court the plaintiff was walking on the track and stepped off a few feet when a train passed, and he saw the shadow of something, and was felled to the ground. A severe wound was found on his head, and a stick of wood, similar to the sticks used on the locomotive, was found imbedded in the earth near where he fell. There was no other evidence that the wood was thrown from the locomotive, or how it was thrown, or that it struck plaintiff. The speed of the train was about 60 miles an hour. The Court decides that the railroad is not responsible.²²

In Missouri it is ruled by the Supreme Court that under the state statute giving a penalty for the death of any person from the negligence of "any officer, agent, servant or employé while running or managing, any locomotive, car, or train of cars," the negligence need not be that of the superior in charge.²³

¹ U. N. J. R. & C. Co. v. N. D. & N. J. R. Co., 18 Atl. Rep., 574.

² A. T. & S. F. R. Co. v. Benton, 22 Pac. Rep., 698.

³ People v. C. & A. R. Co., 22 N. E. Rep., 857.

⁴ Ives v. Smith, 8 N. Y. Supp., 46.

⁵ Y. & M. V. R. Co. v. Thomas, 10 S. C. Rep., 68.

⁶ Fl. Scott, W. & W. R. Co. v. Fox, 22 Pac. Rep., 583.

⁷ Jackson v. Kiel, 22 Pac. Rep., 501.

⁸ Reming v. L. & W. R. Co., 7 N. Y. Supp., 516.

⁹ Cameron v. C. M. & St. P. R. Co., 43 N. W. Rep., 785.

¹⁰ State v. Creden, 43 N. W. Rep., 673.

¹¹ Melbourne v. L. & N. R. Co., 6 South. Rep., 762.

¹² G. C. & S. F. R. Co. v. Levi, 12 S. W. Rep., 677.

¹³ De Bary & Merchants line v. J. T. & K. W. R. Co., 40 Fed. Rep., 392.

¹⁴ McDonald v. L. I. R. Co., 22 N. E. Rep., 1068.

¹⁵ Jones v. C. M. & St. P. R. Co., 43 N. W. Rep., 1114.

¹⁶ Barrett v. M. S. C. R. Co., 22 N. E. Rep., 859.

¹⁷ Morgan v. J. C. & B. R. Co., 18 Atl. Rep., 904.

¹⁸ Taylor v. E. & T. H. R. Co., 22 N. W. Rep., 876.

¹⁹ Williams v. D. L. & W. R. Co., 22 N. E. Rep., 1,117.

²⁰ Stewart v. N. Y. O. & W. R. Co., 8 N. Y. Supp., 19.

²¹ White v. Cent. R. Co., 10 S. E. Rep., 273.

²² McDonald v. C. M. & St. P. R. Co., 43 N. W. Rep., 744.

²³ Lucas v. R. & D. R. Co., 40 Fed. Rep., 505.

²⁴ Rine v. C. & A. R. Co., 12 S. W. Rep., 640.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Evansville & Terre Haute, quarterly, 1½ per cent., payable April 22.

New London Northern, quarterly, 1½ per cent., payable April 2.

New York & New England, 3½ per cent. on the preferred stock, payable May 1.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Adirondack, annual, New York City, April 15.

Annis on & Atlantic, annual, Anniston, Ala., April 30.

Atchison, Topeka & Santa Fe, annual, Boston, Mass., May 8.

Central of New Jersey, annual, New York City, May 9.

Chicago, Rock Island & Pacific, annual, Chicago, Ill., June 4.

Delaware & Hudson Canal, annual, New York City, May 13.

East Tennessee, Virginia & Georgia, special, Knoxville, Tenn., April 15.

Elmira & Lake Ontario, annual, New York City May 1,

Lake Shore & Michigan Southern, annual, New York City, May 7.
 Louisville, New Orleans & Texas, special, Memphis, Tenn., June 5.
 Michigan Central, annual, New York City, May 7.
 New York Central & Hudson River, annual, Grand Central Station, New York City, April 16.
 New York, Chicago & St. Louis, annual, New York City, May 7.
 Ohio Southern, annual, Springfield, O., April 21.
 Omaha & St. Louis, special, Stanberry, Mo., April 28.
 Texas & Pacific, annual, Dallas, Tex., April 15.
 Toledo, Ann Arbor & North Michigan, annual, Toledo, O., April 16.
 Union Pacific, annual, Horticultural Hall, 101 Tremont street, Boston, Mass., April 30.
 Utica & Black River, special, New York City, April 22.

Railroad and Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The American Society of Mechanical Engineers will hold its twenty-first annual convention at Cincinnati, O., May 13.

The Association of American Railway Accounting Officers will hold its next annual meeting at the Stockton Hotel, Cape May, N. J., July 9.

The American Railway Master Mechanics' Association will hold its next annual convention at Old Point Comfort, Va., in June.

The Master Car Builders' Association will hold its next annual convention at Old Point Comfort, Va., June 10. Rooms should be secured of Mr. P. N. Pike, manager, Hygeia Hotel, Fortress Monroe, Va.

The National Association of General Baggage Agents will hold its next annual convention at Chicago, Ill., July 16.

The Traveling Passenger Agents' Association will hold its next annual convention at Buffalo, N. Y., August 19.

The New England Roadmasters' Association will hold its eighth annual meeting at Boston, Mass., Aug. 20 and 21.

The New England Railroad Club meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The Western Railway Club holds regular meetings on the third Tuesday in each month, except June, July and August, at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m.

The New York Railroad Club meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The Central Railway Club meets at the Tift House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The Northwest Railroad Club meets on the first Saturday of each month in the St. Paul Union Station at 7:30 p. m.

The Northwestern Track and Bridge Association meets on the Saturday following the second Wednesday of each month at 7:30 p. m. in the director's room of the St. Paul Union station, except in the months of July and August.

The American Society of Civil Engineers holds its regular meeting on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street, New York.

The Boston Society of Civil Engineers holds its regular meetings at Boston, at 7:30 p. m., on the third Wednesday in each month. The next meeting will be held at the American House.

The Western Society of Engineers holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m., on the first Tuesday in each month.

The Engineers' Club of St. Louis holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The Engineers' Club of Philadelphia holds regular meetings at the house of the Club, 1122 Girard street, Philadelphia.

The Engineers' Society of Western Pennsylvania holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Penn Building, Pittsburgh, Pa.

The Engineers' Club of Cincinnati holds its regular meetings at 8 p. m. on the third Thursday of each month at the Club rooms, No. 24 West Fourth street, Cincinnati.

The Civil Engineers' Club of Cleveland holds regular meetings on the second Tuesday of each month, at 8:00 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the Fourth Tuesday of the month.

The Engineers' Club of Kansas City meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The Engineering Association of the Southwest holds regular meetings on the second Thursday evening of each month at 8 o'clock, at the Association headquarters, Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The Civil Engineers' Society of St. Paul meets at St. Paul, Minn., on the first Monday in each month.

The Montana Society of Civil Engineers meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The Civil Engineers' Club of Kansas holds regular meetings on the first Wednesday in each month at Wichita, Kan.

Engineers' Club of Philadelphia.

A regular meeting was held March 15. President H. W. Spangler in the chair; 19 members and one visitor present. Owing to the unavoidable absence of the secretary, the paper expected to be read was not presented. Mr. T. Carpenter Smith presented an account of the Method of Towing Coal Barges on Western Rivers. Mr. Wilfred Lewis presented an account of a recent visit to the works of the Simonds Rolling Machine Co., at Fitchburg, Mass.

Engineers' Club of St. Louis.

The club met at 8:20 p. m., April 2, 1890, at the Washington University, President Nipher in the chair; thirty-five members and eight visitors present. The minutes of the 324th meeting were read and approved. Messrs. Frederick Egner, John J. Sanders and James N. Tierman were elected members.

Mr. Thos. Long then addressed the club informally on the erection of some recent large bridges. The address was illustrated by lantern slides, showing interesting features of the prominent bridges discussed. A number of slides were devoted to the St. Louis Merchants' bridge, just completed. The last span of this bridge was erected in less than sixty working hours, being the shortest time on record for a double track bridge. The large bridge recently erected across the Ohio River at

Cairo was described. A span of this bridge was erected in 45 working hours, being the shortest reported time for a single track structure. Among the other bridges described by the author were those at Hawksbury, Australia; C. Shaler Smith's cantilever bridge over the Kentucky River; the Niagara cantilever bridge; another cantilever bridge over the Kentucky River; the Hudson River bridge at Poughkeepsie; the Forth, and Tay bridges, the specially interesting features of each being explained.

Mr. Frank Nicholson's paper on "The Pemberton Concentrator" was then read by Mr. Arthur Thacher.

Engineering Society of Canada.

The society held its annual meeting in the School of Practical Science, Toronto, April 5, the president in the chair. The report of the General Committee for the session 1889-90 showed that the society was in a prosperous condition, and outlined the work of the year. The Secretary and Treasurer's report showed an increase of 17 life and 29 ordinary members. The Corresponding Secretary reported that 17 papers were read during the session. A by-law was passed enabling a member to borrow books from the library during the summer months. The election of officers for next year's General Committee resulted as follows:—President, J. K. Robinson; Vice-President, T. R. Deacon; Recording Secretary, C. C. Fairchild, Corresponding Secretary, G. E. Silvester; Treasurer, W. A. Lea; Librarian, A. Lane; Third Year Representative, J. E. A. Moore; Second Year Representative, C. E. Langley. The society passed a vote of thanks to the retiring General Committee for their services.

Master Car Builders' Association.

The secretary announces that the following named railroad companies have become parties to the Rules of Interchange, as prescribed in Rule No. 28, since the last revised Code of Rules was published: Alabama & Vicksburg; Atlanta & West Point; Canadian Pacific; Cincinnati, Hamilton & Dayton; Cincinnati, Selma & Mobile; Des Moines & Northern; Duluth & Iron Range; Grand Rapids & Indiana; Huntington & Broad Top Mountain; Jacksonville, Tampa & Key West; Kanawha & Ohio; Missouri, Kansas & Texas; Montana Union; Newport News & Mississippi Valley; Pittsburgh & Western; St. Louis, Arkansas & Texas; St. Louis, Keokuk & Northwestern; Toledo, St. Louis & Kansas City; Western of Alabama.

In several instances roads in this list have been adhering to the rules of interchange for two or three years, but their names have not appeared in the list at end of interchange rules, owing to a misunderstanding, and a belief on the part of some representative members that the appointment of such a representative by their several companies implied an adherence to the rules of interchange, which is not the case.

Western Railway Club.

The next meeting of the club will be held Tuesday April 15. The subjects for discussion are: "Counterbalancing the reciprocating parts of locomotives," "The M. C. B. Interchange Rules" and "Journal Boxes." The proposed Chicago Joint Defect Card will also again come up for discussion.

Western Society of Engineers.

At the meeting of the Western Society of Engineers, held April 2, a letter received indirectly from Andrew Carnegie was read announcing the approaching meeting in this country of the English Iron and Steel Institute of London, and their probable visit to Chicago and the Lake Superior mining regions.

Before the discussion of the evening was taken up Mr. Jenison explained to the members his plans for a World's Fair building.

The topic of the evening, "The Chicago Railway Problem," especially in relation to terminals, rapid transit and avoiding accidents at street crossings, was discussed informally, no papers being presented, owing to the absence of those who had been appointed. A letter was received from Mr. Chanute recommending that, in case a commission is appointed to solve these problems, the society should furnish the plans and specifications free of charge.

Mr. J. F. Wallace stated that the railroads having grown up with the city, they had certain privileges obtained in early days in connection with entering the heart of the city, and that the only solution of their mutual difficulties was to be obtained by equal concessions on the part of the city, the railways, and the land owners along the lines. The elevated system he thought to be probably the only one which would avoid grade crossings and the present loss of life. Subways would not answer because of the low elevation of the city with reference to the lake. The expense of the elevated roads and their inability to reach certain business sections were the arguments against the elevated system. He estimated the cost of the system at about \$800,000 per mile, based upon head room of 12 ft. above the ordinary elevation. There was less than 20 per cent. difference in the expense of the elevated and depressed systems.

Mr. Isham Randolph suggested that where land is expensive depots should be built of three or four stories, the trains to be brought to the level of the second floor, the lower to be used for storage. Mr. George D. Morrison advised the clearing of the railways from the street, and from each other, and said that the problem could be indirectly solved by lowering the head room now demanded by the railways. Mr. S. J. Artlingstall suggested the employment of the space under the tracks in some way to defray the expense of elevation. Mr. H. C. Alexander favored tunnels, not open cuts, with a common depot. Mr. Desgrangers favored a deep cut railway, with elevators to the surface at the stations. The secretary, Mr. J. W. Weston, said that the existing railways were a serious menace to the growth of Chicago, and thought that the Engineers' Society should formulate a feasible opinion on the question and submit it to the public.

President Cooley thought the ideal system was to have a belt line at a distance of 12 or 15 miles from the city, on which all roads could go to a common clearing house and over which all freight cars could be taken out during the day. In the heart of the city the heavy traffic should be on the lower stories of the road. All traffic should be concentrated on four or five roads only. Give them a leeway in which to work out their own salvation. Such a system would accomplish rapid transit. All points within reasonable limits could be reached by the present cable roads. All railways should form a terminal company and have their tracks and freight houses in common. He advised the getting together of representative business men to study and discuss the problem. It would be a wise expenditure if \$2,000 or \$3,000 were spent in the study, as it is a vital question to the growth of the city.

The subject is to receive more extended attention at the next meeting of the society.

PERSONAL.

—Mr. H. D. Campbell, Secretary and Treasurer of the Pittsburgh & Western, died in Allegheny City, Pa., April 15, of typhoid fever. He was 39 years of age.

—Mr. J. T. Harahan who resigned as General Manager of the Chesapeake & Ohio last February, has been appointed General Manager of the Louisville, New Orleans & Texas.

—Mr. James McDonald, General Manager of the Youngstown Bridge Co., of Youngstown, has resigned and will enter the employ of the Oliver Iron & Steel Co., of Pittsburgh.

—Mr. F. W. D. Holbrook, Manager of the Seattle, Lake Shore & Eastern, has resigned. He has held the position since last June, being, previous to that time, Principal Assistant Engineer, and for a short time Acting Manager.

—Mr. William Galloway, one of the oldest locomotive engineers, died in Baltimore, April 7, of apoplexy, aged 81 years. He had been in the employ of the Baltimore & Ohio Railroad 54 years, and only two years ago was retired on a pension.

—Mr. George H. Ellery died in New York City April 3, aged 80 years. He was formerly Vice President of the Indianapolis & Evansville road and had also been a member of the railroad contracting firm of Ellery, Wendt & Hoffbauer.

—Mr. Thomas Fleisher, Superintendent of the Toledo Division of the Lake Shore & Michigan Southern for 18 years, resigned the position this week. He has been in the service of the road, or lines that now form part of its system, in various capacities for over 25 years.

—Senator Leland Stanford, President of the Southern Pacific Co., resigned that position this week in order to give his entire attention to his personal interests, particularly the Leland Stanford, Jr., University. Mr. C. P. Huntington has been elected President to succeed Mr. Stanford.

—Mr. J. B. Henney, late Superintendent of Motive Power of the New York & New England, was given a complimentary dinner at Young's Hotel in Boston, Wednesday evening, by a number of his late associates, officers and employés. After dinner Mr. Henney was presented with an elegant silver service.

—Mr. B. Andrews Knight, President of the Huntingdon & Broad Top Railroad & Coal Co., died suddenly at his home in Philadelphia, April 4, of heart failure, aged 66 years. Mr. Knight was President of the company since 1868, and had also been President for some years of the Susquehanna & Tidewater Canal Co., until it was absorbed by the Philadelphia & Reading.

—Mr. Benjamin M. Price, Local Freight Agent of the Western New York & Pennsylvania, at Buffalo, died in that city March 30. He was 35 years old, and had been in railroad service for 20 years. He entered the employ in 1875 of the present Western New York & Pennsylvania road, and has been Ticket Agent, Freight Agent, General Agent, Traveling Agent, and since 1885 Freight Agent at Buffalo.

—Mr. Alexander L. Crawford, a prominent iron manufacturer of Pennsylvania, died in New Castle, Pa., April 2, aged 75 years. He built the Etna Iron Works, Crawford Iron & Steel Works, and New Castle Steel Works at New Castle, and other iron and steel works and blast furnaces in Pennsylvania, Indiana, Michigan and other states. He owned large tracts of mineral land in various states and built several railroads to develop them. Among these were the Ashtabula & Pittsburgh, New Castle & Beaver Valley and Nashville & Knoxville.

—Owing to the large increase in its business the Berlin Iron Bridge Co. of East Berlin, Conn., has made some changes in its officers and also in the details of its business. Mr. Burr K. Field, who has for some time been Vice-President and Treasurer, has resigned the latter office, and Mr. F. L. Wilcox, of Berlin, has been elected to the position. Mr. Wilcox was formerly manager of the Kensington factories of the Peck, Stow & Wilcox Co., and is favorably known throughout New England. Mr. Field will devote his entire attention to the contracting department, which has of late years assumed large proportions, the company doing a business of nearly \$800,000 per year.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—The jurisdiction of R. B. Gemmell, Superintendent of Telegraph, has been extended to the lines east of the Missouri River. C. G. Sholes has been appointed Assistant Superintendent of Telegraph, with headquarters at Topeka, Kan.

Frank Bruce has been appointed Division Master Mechanic of the Chicago line, with headquarters at Fort Madison, Ia. Richard English has been appointed Master Mechanic of the Rio Grande division, with headquarters at San Marcial, N. M., vice E. Hockett, resigned. James Collinson, General Foreman of the Topeka shops, has been appointed Master Mechanic of the New Mexico division, with headquarters at Raton, N. M., vice Frank Bruce, promoted.

Cass Street, Lake View & Evanston.—The incorporators and first Board of Directors are Frederick W. H. Sundmacher, Hiram Barber, Samuel W. Jackson, L. R. Hall and H. H. Anderson, of Chicago.

Central of Georgia.—The office of Chief Train Dispatcher of the Savannah & Western division has been created, and W. F. Packard, of Nashville, has been appointed to the position. Mr. Packard was formerly Superintendent of Transportation of the Kentucky Union, but more recently has been connected with the Louisville & Nashville.

Charleston, Cincinnati & Chicago.—George W. Bentley, formerly General Manager of the Jacksonville, Tampa & Key West, has been appointed Vice-President of this road, with office at 45 Broadway, New York City.

Chattanooga Southern.—The following are the incorporators of the Alabama Division of this road, the charter for which was filed last week: John H. Disque, A. S. Woodliff, J. R. Hughes, W. M. Meeks, John P. Ralls, Jr., J. R. Nowlin and R. E. Thomas, all of Etowah County, Ala.

Chautauqua Lake.—Francis S. Jones has been appointed Assistant General Freight Agent of the road, in addition to his duties as Agent at Jamestown, N. Y.

Chicago & Atlantic.—G. M. Beach has resigned the position of General Manager, and the position has been

abolished. All communications heretofore sent to that officer should be addressed to L. G. Cannon, General Agent for the receiver at Chicago.

Chicago, St. Louis & Pittsburgh.—William L. Scott and J. N. Du Barry were elected Directors of the road at the annual meeting held in Indianapolis, April 9.

Chicago, St. Paul & Kansas City.—Richard Berger has been appointed Freight Auditor of the road, vice G. W. Lyndon, resigned.

J. R. Cavanagh has been appointed Car Service Agent, vice C. W. Barnes, resigned. Mr. Cavanagh was formerly with the Northern Pacific.

Chicago & West Michigan.—Russell Wallace has been appointed Purchasing Agent of this road and of the Detroit, Lansing & Northern, and Saginaw Valley & St. Louis, vice Allen Bourn, resigned. Mr. Wallace was formerly Purchasing Agent of the Duluth, South Shore & Atlantic. His headquarters will be at Grand Rapids, Mich.

Cincinnati, Sandusky & Cleveland.—George A. Farlow, son of the late John S. Farlow, has been elected President of the road.

Cincinnati, Wabash & Michigan.—At the annual meeting of the stockholders of the road held in Elkhart, Ind., April 9, the following directors were elected: D. J. Mackey, Wm. Heltman, John Newell, George Bliss, M. E. Ingalls, C. Vanderbilt, C. M. Depew, C. C. Baldwin, James Stillman, James T. Woodard and Joel F. Friedman. D. J. Mackey was elected President, and W. J. Lewis, of the Mackey system, Secretary and Treasurer, in place of W. S. Jones.

Denver & Lookout Mountain Resort & Railroad Co.—H. A. W. Tabor, President; E. F. Halleck, Vice-President; F. G. Patterson, Secretary, and R. W. Woodbury, Treasurer. Directors: A. C. Fisk, Henri R. Foster, A. H. Root, Biddle Reeves, E. T. Webber, W. W. Borst, Henry Lee, E. W. Lowrey, W. A. H. Loveland and H. C. Stuart, all of Denver.

Fitchburg.—M. P. Snyder has been appointed Train Master of the Western division at Mechanicville, in place of G. D. Merrill, resigned. He was formerly Chief Train Dispatcher at Mechanicville.

Fort Worth & Rio Grande.—Joseph E. Scully has been appointed Superintendent of Transportation of the road, with office at Fort Worth, Tex.

Fremont, Elkhorn & Missouri Valley.—George Moore has been made Roadmaster of the South Platte division of the Sioux City & Pacific.

Georgia, Tennessee & Illinois.—L. F. Bellinger is Chief Engineer of this road, previously referred to as the Georgia, Tennessee & Illinois. His address is Tallapoosa, Ga.

Grand Rapids, Chicago & St. Louis.—The following is a corrected list of the officers of this road: W. D. Telford, President; C. E. Temple, Vice-President and General Counsel; C. W. Garfield, Secretary; and F. A. Hall, Treasurer, all of Grand Rapids, Mich.

Highland & St. Joseph.—The following have been elected directors: Charles D. Haines, Elmer T. Haines and Andrew G. Haines, of New York City; Judson Kingsley, of Troy, N. Y., and Jos. S. Beeler, Norman Case and Z. L. Gilmore, of Highland, Kan.

Huntington & Broad Top.—To fill the vacancy caused by the death of B. Andrews Knight the directors have elected Spencer M. Janney President.

Illinois Central.—J. T. Hartigan has been appointed Superintendent of the Chicago division, with office at Cairo, Ill., vice J. C. Russ, assigned to other duties.

Kanawha Dispatch.—Sydney Hall has been appointed Manager of the line, vice W. P. Walker, Jr., resigned.

Kentucky Union.—T. W. Todd has been appointed Chief Engineer of the road, with office at Lexington, Ky.

Kinzua Valley.—The officers of the road are: President, Spencer S. Bullis, Olean, N. Y.; Vice-President, M. W. Barse, Buffalo; Treasurer and General Manager, J. C. French, Olean; Secretary, F. E. Brooks, Bradford; Directors, S. S. Bullis, M. W. Barse, J. C. French, F. E. Brooks, J. R. Rooney, D. H. Jack and G. L. Roberts.

Lake Shore & Michigan Southern.—Thomas Flesher, Jr., having resigned, J. M. Watts has been appointed Acting Superintendent of the Toledo division, with office at Cleveland.

Lockport & Northern.—The company has elected the following directors: John Hodge, Willard T. Ransom, Frank P. Weaver, E. M. Ashley, Edwin L. Jeffrey, William Spalding and Charles A. Hoag.

Long Island.—The annual meeting of the stockholders was held in Long Island City this week. There were 179,935 shares voted for the following directors: Austin Corbin, J. Rodgers Maxwell, Henry Graves, Henry W. Maxwell, James G. K. Duer, Edward Tuck, William G. Wheeler, William B. Kendall, John P. Townsend, James D. Campbell, Daniel Lord, Charles Pratt and George A. Edgell. The two last named succeed Frederick R. Dunton and Alfred Sully.

Louisville, New Albany & Chicago.—J. C. Loomis, lately Superintendent of the Cincinnati Division of the Chesapeake & Ohio, has been appointed Superintendent of the Northern Division, from Lafayette to Monon, and from Chicago to Indianapolis, with office at Chicago. J. B. Safford, Trainmaster of the Jeffersonville, Madison & Indianapolis road, has tendered his resignation, and has been appointed Superintendent of the Southern Division of this road, with office at Louisville, Ky.

W. H. Folsom, Purchasing Agent of the Louisville, Evansville & St. Louis, has resigned to accept a similar position on this road, with office at Chicago.

W. R. Woodward, having tendered his resignation as General Superintendent of the road, John Ewan, Superintendent of Transportation, will perform the duties of Superintendent. Mr. Ewan was formerly Superintendent of the Indianapolis Division of the Cleveland, Cincinnati, Chicago & St. Louis.

Louisville, New Orleans & Texas.—J. M. Edwards having resigned the position of General Manager of this company, J. T. Harahan has been appointed General Manager, with office in Memphis. He will have charge

of the transportation, motive, car and roadway departments, reporting to the Vice-President. The traffic, auditing, and treasury departments will report to the Vice-President, J. M. Edwards.

Louisville, St. Louis & Texas.—John Storrey, formerly Master Mechanic of the Scioto Valley road, has accepted a similar position with this road, with headquarters at Louisville, Ky.

Louisville Southern.—A. H. Ford has been appointed Treasurer and Auditor and A. V. Lafayette, General Freight and Passenger Agent of the road.

Macon & Birmingham.—The annual meeting of the stockholders was held at Macon, Ga., recently, and the old board of directors was re-elected as follows: F. S. Johnson, W. A. Doody, N. M. Hodgkins, Ovid Sparks, Jr., and L. P. Hillyer. These officers were elected: F. S. Johnson, President; W. A. Doody, Vice-President; N. M. Hodgkins, Secretary and Treasurer.

Mexican Central.—H. A. Vaughan, previously Superintendent San Luis Division, is now Superintendent of the Guadalajara Division, with headquarters at Guadalajara, Mex., vice C. E. Halbert. M. S. McCay, previously Superintendent of the Third Division, is now Superintendent of the San Luis Division, with headquarters at San Luis Potosi, Mex.

Milwaukee Belt & Terminal Co.—The incorporators are Frederick W. K. Kauffmann, Theodore B. Talbot and H. L. Faris, of Brooklyn; Judge Warren Higley, of New York, and H. M. Benjamin, Herman Nunnemacher and J. S. Kleni, of Milwaukee.

Minneapolis Union.—The following are now the officers of this company: W. P. Clough, President; J. T. Fanning, Vice-President; Samuel J. Beals, Secretary; Edward Sawyer, Treasurer, St. Paul, Minn.; H. V. Dougan, Superintendent, of Minneapolis, Minn.

Mississippi River & Bonne Terre.—The officers of this company are as follows: J. Wyman Jones, President; James B. Wilde, General Manager; J. Burns, General Superintendent; F. C. Weber, Auditor, and E. T. Shaw, General Passenger and Freight Agent, all of Bonne Terre, Mo.

Monongahela Connecting.—H. W. Watts has been appointed General Agent of this company, and will have charge of such special duties as may be devolved upon him by the General Manager. Thomas E. Turnbaugh has been appointed Yardmaster, to succeed H. W. Watts, promoted.

Montgomery, Tuscaloosa & Memphis.—The names and addresses of the officers of this company are as follows: J. W. Woolfolk, President, 45 Wall street, New York; Chester C. Munroe, Vice-President, of Hoadley & Co., New York City; Chief Engineer, C. M. Craig (Mem. Am. Soc. C. E.), Montgomery, Ala.; John C. Woolfolk, Secretary and Treasurer, and William C. Giles, Assistant Secretary, Montgomery.

Monticello & Tampa.—The following board of directors has been elected: J. H. Perkins, E. B. Bailey, J. S. Denham, T. B. Simkins, Theodore Turnbull, and B. McLendon, Secretary.

Northern Adirondack.—The officers of the consolidated road are: John Hurd, Santa Clara, N. Y., President and Treasurer; Henry Patton, Albany, Vice-President, and George Munger, Bridgeport, Conn., Secretary. The principal office of the company is at Santa Clara, Franklin County, N. Y.

Northern Pacific.—W. S. Kemp, Superintendent of the Rocky Mountain division, has resigned, and has been succeeded by S. G. Ramsey, formerly Superintendent of the Idaho division. F. W. Gilbert, of the Cœur d'Alene division, has been appointed Superintendent of the Idaho division. The Cœur d'Alene division will hereafter be known as the Cœur d'Alene branch of the Idaho division, and will be in charge of John Dorsey. F. E. Griffen succeeds Mr. Dorsey as Assistant Superintendent of the Fergus and Black Hills division.

A. G. Postlethwaite, General Land Agent, having resigned, the position has been consolidated with the general land department, and the duties of the position will be performed by the Assistant Land Commissioner, George W. Board.

W. R. Ford has been appointed Assistant Car Accountant, vice J. R. Cavanagh, resigned, and D. C. Frederick has been appointed Car Accountant of the St. Paul & Northern Pacific, vice Mr. Ford, transferred.

Philadelphia & Delaware County.—The name of the Philadelphia Midland has been changed to the above, and the following directors have been elected: William H. Barnes, President; J. N. Du Barry, John P. Green, William A. Patton, N. Parker Shortridge, Henry D. Welsh and Stephen W. White.

Philadelphia & Reading.—At a meeting of the Board of Managers, in Philadelphia, April 9, George F. Baer, Stephen A. Caldwell and Samuel Shipley resigned, and Thomas Dolan, Henry G. Gibson and A. A. McLeod, Vice-President and General Manager, were elected to fill the vacancies.

Pittsburgh, Cincinnati & St. Louis.—At the annual meeting of the stockholders of the company held at Columbus, O., April 8, the old board of directors was re-elected, with the exception that Henry D. Welsh was chosen in place of William Thaw, deceased.

Portland, Port Angeles & Victoria.—The company was recently chartered in Washington by Charles J. Smith, Edward Cookingham, and Donald Macleay, of Portland; Lewis Levy, E. B. Mastick, Jr., and W. R. Gay, of Port Angeles, Wash., and A. C. Martin, of Seattle.

Rome & Decatur.—G. E. Esteve has been appointed Auditor and Hugh Given Roadmaster. Mr. Esteve has been in the office of the Auditor of the Chattanooga, Rome & Columbus.

St. Louis & California.—H. L. Morrill, E. J. Smith and E. D. Kenna, of St. Louis; W. H. H. Clayton, James Brizzolara and W. A. Thomas, of Fort Smith, Ark., and R. B. Davidson, of Fayetteville, Ark., have filed the articles of incorporation of this company in Arkansas.

Sheffield & Seaboard.—At a meeting in Aberdeen, Miss., last week, these officers were elected: W. L. Chambers, President; Gen. Reuben Davis, Vice-President; and J. V. Allen, Secretary and Treasurer. Directors: S. A. Jonas, B. C. Sims, S. H. Rerg, Reuben Davis, Robert E. Houston, all of Aberdeen, and Arthur H. Keller, Henry Habbeler, George T. McGregor, Alfred H. Moses, R. C. Randolph, J. V. Allen, C. F. Conrad, W. L. Chambers, all of Sheffield, Ala.

Southern California.—W. B. Reamer has been appointed Superintendent vice G. W. Sanborn, resigned. His headquarters are at San Bernardino, Cal.

Frank Dorwin has been appointed Superintendent of Telegraph, with office at San Bernardino, Cal., to succeed S. B. Floeter, resigned.

Southern Pacific.—At the annual meeting of the company, held in San Francisco, April 9, the following directors were elected: C. F. Huntington, Leland Stanford, Charles F. Crocker, Thomas E. Stillman, F. H. Hubbard, A. N. Towne, J. C. Stubbs, E. H. Miller, Jr., S. T. Gage, W. N. Huntington and W. E. Brown. The Board of Directors elected officers as follows: President, C. F. Huntington; First Vice-President, C. F. Crocker; Second Vice-President, A. N. Towne, Third Vice-President, J. C. Stubbs.

Vermont & Massachusetts.—G. F. Fay, of Fitchburg, has been elected President, to succeed the late D. S. Richardson.

Western Maryland.—The directors have elected George H. Baer Secretary and Treasurer, vice John S. Harden, deceased.

OLD AND NEW ROADS.

Akron & Chicago Junction.—Two surveys have been made for this road between Akron and Chicago Junction, O., 68 miles, and the estimates are now being made. The right of way is being secured and the grading will begin as soon as the weather becomes settled. The road is projected in the interests of the Baltimore & Ohio.

Anniston & Atlantic.—At the annual meeting at Anniston, Ala., April 30, the stockholders will act upon a resolution of the board of directors, authorizing the extension from Sylacauga, its present terminus, to Shelby, Ala., and also to authorize changing the gauge standard.

Atchison, Topeka & Santa Fe.—The gross earnings, operating expenses (exclusive of taxes and rentals), and net earnings of the road and auxiliary lines for February were as follows:

	Gross Earn.	Oper. Expen.	Net Earn.	Oper. Mil.
Roads owned and controlled.....	\$2,095,493	\$1,462,474	\$633,019	6,528
Roads jointly owned with other companies:				
Atchison's one-half....	125,820	110,429	15,391	382
Total.....	\$2,221,313	\$1,572,903	\$648,410	7,110

The comparative statement, all lines, is as below:

	Gross Earn.	Net Earn.	Mileage.	Gross. Earn.	Net Earn.
Feb., 1890....	\$2,221,313	\$648,410	7,110	\$312	\$91
Feb., 1889....	1,864,973	382,773	7,115	262	54
Inc.....	\$356,340	\$265,637	Dec. 4.76	\$50	\$37

Auburn, Ligonier & Chicago.—The survey of this road is to begin at Westville, 12 miles west of La Porte, Ind., April 15. It will be continued west, following the grade of a road which was abandoned after being partly constructed. The company announces that it proposes to build a parallel road from Auburn, Ind., to Chicago.

Baltimore & Eastern Shore.—The train service has been extended from St. Michael's, Md., to Claiborne, on the shore of Easton Bay, where the terminals have been nearly completed. The grading south of Easton has been finished to Harlock's in Dorchester County, on the Philadelphia, Wilmington & Baltimore, and trains will soon be running to that point. The uncompleted section between Easton and Salisbury, Md., 40 miles, is being finished at the rate of half a mile a day.

Birmingham, Sheffield & Tennessee River.—Last week this company let the contract to build an extension of 11 miles from Margerum, Ala., to a point at the head of navigation of the Tennessee River, where the new town of Riverton will soon be established. The work is to be completed by June 15.

Brigantine Beach.—This road has been completed from Pomona, N. J., on the Camden & Atlantic, about 12 miles above Atlantic City, to Brigantine Beach. The distance is 13 miles. Coffin & Co., of New York City, were the contractors.

Carolina Southern.—The surveys for this road are now in progress between Chiran and Sumter, S. C., 65 miles, under C. C. Wilson, of Columbia, S. C. W. G. Childs, of Columbia, is President, and William Moncre, of Durham, N. C., is Chief Engineer.

Cass Street, Lakeview & Evanston.—The company has filed articles of incorporation to build an elevated road from the city of Chicago to the village of Evanston by the following route: From Wabash avenue and Madison street north to South Water street, to River street, to Dock street, to the Chicago River, thence from the north side of the river to Cass street, to Chicago avenue, to La Salle avenue, to Clark street, to the city limits, thence in a northerly direction to the north line of the village of Evanston. A branch is proposed from Chicago avenue to Halsted street. The capital stock is \$6,000,000.

Charleston, Sumter & Northern.—The contract for the branch from Entwistle to Pond Bluff, S. C., has been awarded to Robert S. Pringall, Summerville, S. C.

Chattanooga Southern.—Last week the company filed articles of incorporation for its Alabama division at Montgomery. The line in Alabama will begin in Cherokee County, at the Georgia line near Menlo or Alpine, Ga., and pass through the counties of Cherokee and Etowah to Gadsden, and through the counties of Cherokee and Calhoun to Piedmont and Anniston.

C. E. James, of Chattanooga, President of the construction company, states that the 80 miles between Chattanooga and Gadsden, Ala., is under contract to be completed in six months. Work is to be pushed from both Gadsden and Chattanooga. It is stated that the sub-contract for the first 20 miles from Gadsden was let for \$200,000.

Columbia & Kootenay.—The bill incorporating this company has passed the Dominion Parliament, and it is announced that the contracts for building the road will be let immediately. The road is projected in the interest of the Canadian Pacific and is to be built from a point on Kootenay Lake, B. C., to the junction of the Columbia

and Kootenay rivers. Henry Abbott, of Vancouver, B. C., is President.

Deadwood Central.—It is stated that this company has transferred the deeds for the right of way of its local line to Pennington, S. D., to the Burlington & Missouri River road, and that the force now at work above Deadwood is employed by the latter line. The road will be built to Newcastle, Wyo., to connect with the Burlington & Missouri River.

Deer Creek & Susquehanna.—A project is being discussed to extend this road to Coatesville, Pa., on the Wilmington & Northern, thence to the Schuylkill River, about eight miles below Reading, and to a connection with the Lehigh Valley at Bethlehem.

Deming, Sierra Madre & Pacific.—Elliott & Huss, the contractors, have resumed work at Deming, N. M., on the graded section from Deming south to the Mexican line. Tracklaying will soon be finished on the first 40 miles.

Embreeville.—The survey has been completed between Johnson City and Embreeville, and is now in progress between Embreeville and Jonesboro, Tenn. Another line will be run between Limestone and Embreeville. It is about eight miles from Jonesboro to Embreeville, and some twelve miles from Johnson City to Embreeville. The survey from Johnson City to Embreeville passes within one and one-half miles of Jonesboro. It is seven miles from Jonesboro to Johnson City.

Fordville & Middlesborough.—A charter has been asked from the Kentucky legislature for this company, which is to build an extension of the Owensborough, Falls of Rough & Green River road from Fordville to Cumberland Gap. The incorporators also ask that the charter of the Mississippi Valley & Cumberland Gap, which expires shortly, be extended. The directors are: R. S. Triplett, M. H. Chamberlain, J. A. Faqua, E. Hill, W. L. Jackson, Jr., M. C. Alford, J. H. Dodd, J. H. Rudy, D. W. Saunders, D. H. Smith, S. M. Deane, M. V. Monarch, J. W. M. Field and G. V. Triplett.

Georgia, Carolina & Northern.—The first contract for grading in Madison County, Ga., has been let to T. K. Brown. It is for six miles, from the Broad River, and brings the road within 20 miles of Athens. About 200 men are engaged on the grading on this section. The engineers are finishing the location for the entrance to the city.

Grand Rapids, Chicago & St. Louis.—The contracts for this road will probably be let about June 1. It is to extend from a point on the Plaster Creek branch of the Grand Rapids & Indiana via Holland, Saugatuck and South Haven to Benton Harbor, Mich. The work to be done is quite easy. The maximum grade is about 40 ft. The Grand Rapids & Indiana will operate and equip the road. Its southwestern connection will probably be the Terre Haute & Indianapolis, connection being made at its northern terminus, near St. Joseph, Mich. William McLoughlin, Grand Rapids, is Chief Engineer.

Great Falls & Montana.—The contractors, Grant, Ross & Co., of Winnipeg, have commenced work on the line, at Great Falls, Mont., on the west side of the Missouri River, and near the Montana Central tracks. The route is from Great Falls north to the Dry Fork and down that river to the Marias River at Conrad, and then following that river a few miles; thence north to the international boundary line, striking it about 10 miles west of the Sweet Grass Hills. From this point the route is an air line to Lethbridge, Alberta, about 225 miles from Great Falls. K. W. D. Barclay is Chief Engineer.

Greenfield & Northern.—The company has filed in Missouri a certificate of extension from South Greenfield, in Dade County, to Mt. Vernon, in Lawrence County, where it will connect with the St. Louis & San Francisco. The distance is 36 miles. The company has increased its capital stock from \$285,000 to \$650,000.

Highland & St. Joseph.—A charter was issued to this company in Kansas last week. The road is to extend from Highland to some point on the St. Joseph & Grand Island Division of the Union Pacific near Ryan's Station, in Doniphan County. The capital stock is \$80,000.

Kansas City, Watkins & Gulf.—The grading on this road has been completed for 60 miles from Lake Charles, La., north. Rails have arrived at Lake Charles, and tracklaying will soon begin.

Kentucky Roads.—Bills have been introduced in the state legislature to incorporate the following roads: Fordville & Middlesborough; the incorporators are R. S. Triplett, M. H. Chamberlain and others. Kentucky & Cumberland, to build from Frankfort southward to a point on the Tennessee state line in Cumberland County; J. C. Fawcett, E. H. Taylor, John W. Rodman and others are the incorporators. Louisville, Mt. Sterling & Norfolk; with William Mitchell, J. G. Trimble and others, incorporators. Hartford & Fordville; Owensboro Belt; Turners' Station, Drennan Springs & Owenton; Uniontown & Clarksville; Danville, Lancaster & Pound Gap; Cumberland River & Jellico; Kentucky & Southeastern; Cincinnati & Kentucky; Paducah, Smithland & Southern; Carter County, and the Accommodation, to build a line to Louisville and to points in Jefferson and Bullitt counties; the motive power may be steam or electricity. The incorporators are Albert W. Moreman, Proctor K. Malin and Chapez Wathen, of Meade County. A bill has also been introduced to incorporate the Capital Contract Co. of Louisville, with Charles R. Long, R. T. Scowden and others as incorporators.

Kinzua Valley.—The Bullis Lumber Co. has organized this company to build a road from Mt. Alton to Morrison, Pa., on the Western New York & Pennsylvania, a distance of 25 miles.

Louisville & Nashville.—The following report gives the earnings for February, and the eight months to Feb. 28:

Month of February:	1890.	1889.	Inc.
Gross earnings.....	\$1,496,846	\$1,346,528	\$150,318
Oper. expenses.....	907,866	829,001	78,865
Net earnings.....	\$588,980	\$517,527	\$71,453
Proportion of exps. to gross earnings.....	60.65%	61.57%	
July 1 to Feb. 28:			
Gross earnings.....	\$12,787,339	\$11,052,631	\$1,734,697
Oper. exps.....	7,530,230	6,700,721	789,518
Net earnings.....	\$5,257,091	\$4,291,910	\$965,181
Proportion of exps. to gross earnings.....	58.98%	61.10%	

Louisiana & Northwest.—The name of the Louisiana, North & South, has been changed to the above. The southern extension from Gibsland to Bienville, La., on the Vicksburg, Shreveport & Pacific, 16 miles, has been placed in operation. A reconnaissance has just been made for the proposed extension to Alexandria, 90 miles. If the extension is built to Natchitoches, it would be about 55 miles long. G. Knobel is Chief Engineer.

Marietta & North Georgia.—The section between Talking Rock and Ellijay, Ga., 15 miles, was changed to standard gauge last week.

Mexican Roads.—The Department of Public Works has granted a concession to George Wilson for a standard gauge road from a point on the Tehuantepec National road to the Guatemalan border, also for a pier at the port of San Benito. Surveys must begin within a year and construction within two years. At the end of the third year, and within each year thereafter there shall be completed at least 30 kilometres of the road, under penalty of the forfeiture of the concession. The subvention is \$8,000 per kilometre, payable in five per cent. 40-year subvention bonds.

Milwaukee Belt & Terminal Co.—The company was chartered in Wisconsin this week with a capital stock of \$2,500,000 to build a belt line at Milwaukee.

Montgomery, Tuscaloosa & Memphis.—It is expected that the grading on the section now under construction from Montgomery through Prattville to Maplesville, Ala., 49 miles, will be completed by May 1. The route beyond Maplesville has not been located, but the next 50 miles toward Tuscaloosa will probably be under construction by April 15. The work is rather heavy. The maximum grades are 1.25 per cent. and maximum curvature is six degrees. Jas. M. Brown & Co., 115 Broadway, New York City and Montgomery, are the general contractors for all the work. Two iron bridges will be built, the first over the Alabama River and the other over the Cahaba River. The first will consist of a 300-ft. draw and two fixed spans of 150 ft. each. The exact character of the Cahaba bridge is not determined. It will probably consist of two spans of 125 ft. each, or a single span of 250 ft. The present route will necessitate an 850-ft. tunnel, but this may be avoided by the locating survey. C. M. Craig, of Montgomery, is Chief Engineer.

Monticello & Tampa.—The right of way has been secured from Monticello south for some distance through Taylor County. The road is projected to Tampa.

Morristown & Cumberland Gap.—Cutler & Allison are making the final survey of this road between Morristown and Cumberland Gap, Tenn.

Natchez, Jackson & Columbus.—This road which has been operated by the Louisville, New Orleans & Texas since last July, has been purchased by that company, including its franchises, equipment and other property.

New Roads.—Charles Beweck & Co., who have a saw mill at Hazlehurst, Ga., propose to build a road from that point west through Appling, Coffee and Irwin counties to Irwinstown, a distance of about 40 miles. The route is through a fine timber section. Probably about 28 miles of the road will be completed this year.

A road is proposed from Chattanooga, Tenn., to Anniston, Ala., via Round Mountain, Centre and Jacksonville, and it is reported that the first 20 miles from Chattanooga in the direction of Centre is under contract.

The Board of Trade, of Lincoln, Neb., is agitating the building of a road from Omaha southwest to Phillipsburg, Kan., through Lincoln, Crete, Nelson and Red Cloud.

New York & New England.—The company has petitioned the State Railroad Commissioners to grant it authority to construct a short branch from Norwood to Walpole, Mass. The proposed loop would leave Norwood at the company's yard, and, running 3½ miles, would rejoin the present road just beyond Tilton station. The Old Colony opposes the petition, as it desires to build a line over much the same route to connect two of its branches.

New York, New Haven & Hartford.—The double tracking is progressing. Probably by June 1 the entire distance on the Shore Line division between Clinton, Conn., and Niantic, 20 miles, will be completed. Between East Lyme and Niantic, a mile and a half of new track has been built, which saves 600 ft. over the old route, and does away with three long pile bridges. Further west a mile of new road saves 600 ft. more, and at Stony Creek, a mile and a half of new road will save 1,000 ft.

Northern Adirondack.—An agreement for the consolidation and merger of the Northern Adirondack Extension and the Northern Adirondack, forming the Northern Adirondack railroad company, was filed in the office of the Secretary of State, at Albany, N. Y., last week. The capital stock of the new company is \$450,000.

Northern Central.—The directors have authorized the construction of two new grain elevators at Baltimore. One will be erected on or near the site of the old Canton elevator; it will hold 1,000,000 bushels of grain, and cost about \$300,000. The other will be erected in the city of Baltimore, the capacity of which will be 250,000 bushels and cost about \$150,000. For the purpose of providing a portion of the necessary capital for the construction of the elevators at Baltimore, the privilege will be given to the shareholders April 15 and May 1 for 5 per cent. of their respective holdings.

Northern Pacific.—The last rail on the Gallatin and Butte branch was laid March 29, and it will probably be opened for regular freight and passenger traffic by May 1. The surfacing has not yet been completed. The line extends from Gallatin west to Butte, Mont., 70 miles, and considerably shortens the main line of the Northern Pacific.

On the Elkhorn branch between Elkhorn and Boulder, Mont., 21 miles, the tracklaying will probably be finished this month. Green, Keefe & Co., of Helena, are the contractors. On the extension from Missoula, Mont., to Mullan, Idaho, 140 miles, the tracklaying has been completed for 31 miles west from Missoula, and the entire extension may be completed in December.

Ohio Valley.—A. J. Warner, President, will receive bids at Bellaire, O., until April 20 for the grading, masonry and bridging on 15 miles of road, between Bellaire and Powhattan, Belmont County.

Ontario & Rainy River.—The Ontario Legislature has been asked to grant this road a cash subsidy of \$3,000 per mile on 30 miles of the line west from Sand

Lake, Ont., the terminus of the 50-mile section, for which a subsidy has already been granted.

Oregonian.—In pursuance of a decree of the United States Circuit Court of Oregon, this road was sold at Salem, Ore., April 4, R. Koehler, Manager of the Oregon Division of the Southern Pacific Co., being the purchaser at \$1,000,000. This gives the Southern Pacific a formal title to the road, which was purchased by it some time ago.

Oregon & Washington Territory.—The road has secured running rights over the line of the Northern Pacific between Wallula and Pasco, Wash., 16 miles.

Ottawa & Parry Sound.—A bill is before the Ontario legislature to give this road a cash subsidy of \$3,000 per mile on the 30 miles from Egansville to a point in the township of Sherwood, Ont. Such crown lands as lie within a distance of ten miles on each side of the road are set aside to form a subsidy fund.

Philadelphia & Delaware County.—The purchasers of the Philadelphia Midland at sheriff's sale on March 3 last have reorganized the company under the above name. The road is controlled by the Pennsylvania. The Philadelphia Midland was projected to run to Angora, where a connection was to have been made with the West Chester road to West Chester, a distance of about 22 miles. Considerable grading and other work of construction was done, but the work was abandoned. The property was sold for \$10,000, under a judgment for \$29,270. It is doubted whether the road will be built at all.

Piedmont Southern.—The surveyors are about 10 miles from Gadsden, Ala., surveying east through Piedmont to Roanoke.

Pineville, Mt. Pleasant & Big Stone Gap.—This company was recently incorporated in Kentucky to build a road from Pineville through Leslie, Perry, Letcher, Harlan and Knott or Pike counties to West Virginia state line. Among the incorporators are: W. F. Hall, S. Howard, Wright Kelley and J. H. Middleton.

Pittsburgh, Akron & Chicago.—The company has filed in Ohio a mortgage executed to the American Loan & Trust Co., of New York, to secure funds for the construction of its line from Akron to Delphos. The mortgage provides for the issuance of five per cent. bonds to run for 40 years. The amount is \$3,630,000. A survey has been made to Findlay, O., and, if the company is voted a sufficiently large subscription, it will abandon part of the present route between Carey and Delphos and build through Findlay and west, purchasing the completed road of the American Midland to Ottawa and the grade to Fort Wayne, Ind.

Portland, Port Angeles & Victoria.—The company has been incorporated in Washington with a capital of \$3,000,000 to build five lines of railroads, as follows: From Port Angeles southerly to Gray's harbor; from Gray's Harbor easterly and southeasterly to Portland; from Port Angeles easterly to Port Townsend; from a point in Chehalis county, on the Chehalis River, easterly to Olympia; from Gray's Harbor southerly to a point on the Columbia River opposite Astoria. In addition, the company is empowered to operate steamship lines between Port Angeles, Victoria, Portland, San Francisco, Gray's Harbor or other Pacific coast points. C. J. Smith, of Portland, Ore., is one of the incorporators.

Portland, Sellwood & Milwaukee.—N. J. Blager, of Portland, Or., has been awarded the contract for grading this road between Portland and Sellwood and Milwaukee. The contract is said to have been let at \$45,000. The road is to be in operation next December.

Port Townsend Southern.—Hale & Smith, of Portland, Or., have been awarded the contract by the Oregon Improvement Co. for building the road from Port Townsend, Wash., south toward Hoods Canal. E. W. McGornisk also has a contract. The first 20 miles are being cleared, and it is expected to have this section completed by Sept. 1, and to have 70 miles finished by Jan. 1. About 500 men are being employed at present. Port Townsend has subscribed \$100,000 in cash, and given a large land grant to the company. J. B. Hogg, of Port Townsend, is Chief Engineer.

Richmond & Danville.—Trains on the extension from Winston west to Wilkesborough, N. C., are running to Elkin, Yadkin County.

Richmond, Fredericksburg & Potomac.—A mortgage deed from the company to the Central Trust Co. of New York, was filed in the office of the Chancery Court, at Richmond, Va., April 4. The deed is to secure the payment of \$2,000,000 fifty-year bonds issued under a resolution adopted at the last general meeting of the stockholders of the company, to provide for double tracking the road and to make various other improvements.

Rio Grande Junction.—Standard gauge rails have been laid alongside of the narrow-gauge track on the Denver & Rio Grande, between Newcastle and Rifle Creek, Col., 14 miles. The grading has been completed on much of the distance between Rifle Creek and Grand Junction, 63 miles, and tracklaying will commence at once. The track will be laid by the Colorado Midland, and a machine tracklayer will probably be used.

Rome Mineral.—This company proposes to build a road from Rome north to Ringgold, Catoosa County, Ga., about 48 miles. The line will also be extended from Ringgold to the Tennessee River, about 68 miles from Rome.

St. Louis & California.—The company has been incorporated in Arkansas by H. L. Morrill, of St. Louis, General Manager of the St. Louis & San Francisco, and others. The route proposed is from Rogers, Benton County, Ark., to Bentonville, thence to what is known as the "Fifteen Mile Post," on the western boundary of the Arkansas State line, a distance of 35 miles.

Seattle & Northern.—McKenzie & Gibbons have been awarded the contract for the cross-ties and tracklaying on the graded section of the road from Fidalgo Island, Wash., up the Skagit Valley, 30 miles. The firm has also been awarded the contract for clearing and grading on an extension up the Skagit River from the present terminus. The surveys are in progress for a further extension east toward the mountains. L. C. Roberts, of Anacortes, Wash., is Superintendent.

Sheffield & Seaboard.—The company has been organized at Aberdeen, Miss., for the purpose of building a road from Aberdeen to Sheffield, Ala., a distance of about 100 miles. The road will extend east from Aberdeen through Monroe County, Miss., and enter Alabama near the northwestern corner of Lamar County. In Alabama it will pass northeasterly through the coun-

ties of Marion, Franklin and Colbert, to Sheffield and Tusculum. The city of Aberdeen will be asked to issue \$50,000 in 6 per cent. bonds as a bonus to the road; also 20 acres of land for terminals.

Shuswap & Okanagan.—The bill to aid this company has passed the British Columbia Legislature. The Provincial government will guarantee the interest on an issue of four per cent. 25-year bonds, not to exceed \$1,250,000. But the company is to assign to the government its subsidy of \$3,200 per mile granted by the Dominion Parliament. The road is to extend from a point on the Canadian Pacific, or near Sicamous Narrows, up the Shuswap River, and from Spallumcheon to a point on Okanagan Lake. The road will be operated by the Canadian Pacific.

South Bound.—The Savannah Construction Co., which has been organized to build this road, has elected the following directors: J. H. Parker, Frank S. Pambleton, B. Cohn, C. Watkins, B. A. Denmark, H. Myers, M. Brown, H. M. Comer, John Flanery, J. H. Estell, E. A. Weill, W. B. Stillwell and T. F. Stuff.

Spokane Falls & Northern.—Tracklaying will be resumed this week on the extension from Colville north to Marcus, Wash., on the Columbia River. The contract for a further extension from Marcus to Little Dalles will be let this or next week. E. J. Roberts, of Spokane Falls, is Chief Engineer.

Stanstead & Hereford.—This is the name of the proposed road from Stanstead to Hereford, P. Q., and Canaan, Vt., recently referred to. The Dominion Parliament will be asked to grant a subsidy, and it is expected that the Boston & Maine will agree to operate the line. At the recent meeting of the projectors at Norton, Vt., the following committee was appointed to have charge of the matter: A. M. Stetson, of Boston; M. F. Hackett, W. K. Baldwin and R. M. Woodward.

Toronto, Hamilton & Buffalo.—The city of Hamilton, Ont., voted this company a subsidy of \$275,000 at an election held in that town April 2.

Union Pacific.—In speaking of the extension from Milford, Utah, southwest, one of the engineers says: "The work of building the line between Milford and Pioche is steadily progressing. There are 2,000 men employed at present, scattered over 115 of the 145 miles of the road to be built. It is being constructed in sections. At Milford rails for about 20 miles have been delivered. By Dec. 1 trains will probably be running into Pioche. Four surveying parties are working on the line from Pioche. Lines have been run west from Pioche through White Pine, Eureka and Beckwick Pass and south from Pioche to the Atlantic & Pacific road at Ludlow." H. M. McCartney, is Resident Engineer in charge of the construction of the extension.

Upper Coos.—The survey for the extension to Whitefield, N. H., on the Maine Central, 30 miles, is progressing, and will probably be completed in two weeks.

Washington Southern.—A meeting of the stockholders is to be held at Alexandria, Va., April 30, to vote on an issue of bonds by the consolidated company, to the extent of \$2,500,000.

Wheeling & Lake Erie.—The Steubenville branch, from Portland Station, on the Ohio River, to Steubenville, O., 14 miles, is now in process of construction; the only difficulty about the work is on account of the Ohio River valley being narrow, and it being already occupied by towns, roads and railroad tracks. The gradients and curvature are light. Graduation and masonry and trestle work have been let to Ripley & Rexford Bros., and the truss bridges to the Massillon Bridge Co. Surveys are now being made for an extension from Portland to Bellaire, 12 miles, along the river by way of Martin's Ferry. The local aid and right of way solicitors are now at work, and it is expected to have this line constructed during the present season.

Worthington Valley.—This is a proposed road to extend through the Green Spring Valley, through Bloomfield Gap, up Chestnut Ridge, through Worthington Valley, Dover, the Western Run Valley to Black Rock Mills; thence through Manchester and Hoffmanville, Md., to the Pennsylvania line and to Centerville, on the Northern Central. It is stated that the latter road will operate the line when completed. The estimated cost is \$200,000, of which it is proposed to raise \$100,000 by a mortgage for that amount, and the rest by subscriptions along the route. About \$50,000 has been secured. J. J. Caldwell, of Glyndon, Md., is interested.

TRAFFIC.

Chicago Traffic Matters

CHICAGO, April 9, 1890.

The general committee of representatives from each line represented at the general meeting of presidents last week were in continuous session three days, when they adjourned until April 15. In the meanwhile an amended copy of the proposed agreement will be transmitted to the various lines interested, including those which have not yet been represented at the meeting. The changes made in the agreement as submitted by the committee are mainly in the machinery of the association. The matter of territory to be embraced was temporarily passed. An additional section was added to the rules governing the freight divisions, providing that "two or more lines which alone are interested in any given traffic may agree on rates or adjust their differences in such manner as they may elect, at a meeting or otherwise, provided that before the result of such adjustment is put into effect, the Commissioner shall approve the same and notify the members." The articles of agreement of the Western States Passenger Association (referred to elsewhere) were substituted for the article governing passenger associations, after amending the territorial clause to conform to the proposed territory of the Western Associated Railways. In regard to the regulation of competitive traffic and a plan of arbitration, the committee was not unanimous, and these subjects will be further considered on the 15th.

The passenger men of the western lines have adjourned until April 10, without reaching any settlement of the questions before them. They had agreed upon the adoption of an agreement, substantially the same as that of the defunct "Western States Passenger Association," the only line not voting for it being the Wisconsin Central, whose representative asked for delay until he could receive instructions from his company as to the policy to be pursued under the new relations with the Northern Pacific. After the meeting of Presidents, April 2, which endorsed the action of the passenger men, it was supposed that no opposition would be made by any line, and that the proposed agreement would be adopted unanimously and a restoration of passenger rates

be effected at an early date. When, however, the meeting reassembled and attempted to carry out the instructions of the Presidents to "go ahead," the Wisconsin Central was not yet ready to vote, and the Missouri Pacific representative announced that his orders were not to vote for any reorganization at the present time. Consequently, the meeting could do nothing but adjourn, which it speedily did. The action of the Missouri Pacific in withholding its assent to the passenger agreement and in not attending the conference upon the reorganization of the freight agreement is explained by the statement that this line objected to reorganizing the associations, so long as the traffic contract between the Union Pacific and the Northwestern remains in force, believing this contract to be an important disturbing element at the present time.

The Western Freight Association convened yesterday with a full docket. The most important subjects under consideration are the notices of the Chicago & Alton to establish a 10-cent rate on lumber, Chicago to the Missouri River, and to establish a 12-cent rate on packing house products, Kansas City to Chicago, carloads. The request of this road to allow on interstate shipments of live stock in common cars an amount equal to the usual car mileage for double the distance hauled was ruled out. The Wabash wants to make a rate of 22 cents on live hogs, Kansas City to Chicago.

The Freight Committee of the Central Traffic Association met yesterday, and resolved that rates on iron and iron articles be made on the basis of sixth class in carloads and fifth class in less than carload lots. It will become effective April 17, and remain in effect until Sept. 1.

A bill has been introduced in the Iowa Legislature which proposes to compel the railroads to make the rates, locally, in Iowa, the same as the proportions they accept on through interstate traffic. It is not likely, however, that the bill will pass.

Traffic Notes.

The Buffalo Weighing & Inspection Bureau made \$1,041 in March. The expenses of the Bureau were \$532.

The Denver, Texas & Fort Worth has reduced the passenger rate from Fort Worth to Denver from \$24 to \$19.60.

The Lake Superior lake lines have announced their tariffs at St. Paul. The rates are based on 71 cents per 100 lbs. New York to St. Paul, the same as last year.

The New York, Chicago & St. Louis took 18 per cent. of the flour, grain and provisions out of Chicago last week, and its competitors allege that it has cut rates on oats.

The Wabash has announced a reduction of \$1 in fare between Toledo and St. Louis and Kansas City. The object is to make the same rate per mile on the Toledo division as on the rest of the system.

The *Equipment Guide* prints the movements of Southern Central car No. 247, which was away from home from June 12, 1886, to Nov. 6, 1889. About five months seems to be the longest sojourn it made on any one road.

The roads running West from Boston ask the trunk lines to agree to a reduction of the differentials allowed the Chesapeake & Ohio on westbound freight, complaining that that road gets too large a share of the business.

The roads between the coalfields and Lake Erie have established the rate on coal for the summer the same as last year. Much pressure was brought to bear to increase the differential of 5 cents in favor of the Hocking Valley region, but it was left unchanged.

A newspaper item states that the Delaware, Lackawanna & Western has announced a tariff on coal from the mines to tide water, in which the rate is based on the selling price of the coal on board vessels. The price is said to be 50 per cent. of the market rate, and is estimated to work a reduction of 20 cents a ton.

The Pennsylvania has abolished all monthly, school and family tickets between Pittsburgh and East Liberty, issuing in their stead 15 trip tickets costing 6% cents per trip, the rates being uniform to all suburban points between the two places mentioned. The road has to compete with fast cable roads at these stations.

The Supreme Court of Iowa in a suit against the Illinois Central has decided that a railroad transporting butter in warm weather is bound to protect it from damage by heat. In the case tried, a shipment from West Union, Ia., went in a refrigerator car as far as St. Louis, and was there transferred to an ordinary car.

An application has been made before Judge Gresham, at Chicago, by the Lake Erie & Western for an injunction to restrain the Peoria & Pekin Union from delaying cars from western points. It was alleged that the Peoria & Pekin Union delays freight cars sometimes for 30 hours, keeping them in the yards before delivering to the complainant.

A Cleveland paper states that the reported agreement between the Cleveland, Cincinnati, Chicago & St. Louis and the "Mackey" system consists essentially in a close traffic agreement, the chief feature of which is the securing of an entrance into Chicago for the "Big Four," over the Chicago & Eastern Illinois. It is said that the Mackey syndicate agrees not to extend its lines eastward.

Senator Cullom has reported favorably from the Committee on Interstate Commerce the bill to amend section 12 of the Interstate Commerce act. The amendments provide that the Commission may require the attendance of witnesses and the production of documents from any place in the United States at any place of hearing fixed by the Commission; also, that testimony may be taken by deposition upon motion by any party to the case, or by the order of the Commission.

The Interstate Commerce Commission has decided, in a complaint against the Richmond & Danville, that refusal to redeem unused commutation tickets and refusal to refund cash fares paid when a season ticket was left at home are not unlawful. Also that it is lawful to collect 25 cents extra from passengers who pay in the cars. The complainant based some of his claims on the fact that a relaxation of these rules had been customary, but it appeared that the stringency from which he suffered had been duly announced in a tariff issued and posted according to law.

The Minnesota Railroad Commissioners, in the complaint of Henry Oswald & Son against the St. Paul, Minneapolis & Sault Ste. Marie, have decided that the charge for switching cars must be the same to various private sidings which are located within a few hundred feet of each other. It was alleged that one firm located about 1,000 ft. further from the yards of the company than that of the complainants was charged a lower rate. Rates had varied from \$2.50 to \$5. The Commission dis-

cusses the question of cost of service, and orders a rate of \$2 per car to be made for all the parties in question.

The Kansas Railroad Commissioners insist that the roads of that state must charge for live stock by the carload and not by the 100 lbs. It will be remembered that when the railroads adopted the latter plan for interstate traffic, Kansas compelled them to continue the old practice in that state. The roads have now applied for a change in the ruling, but have been refused. Shippers have been persistent in their agitation, and the newspapers have printed editorials about the matter. The gist of the complaints seems to be that weighing sometimes causes long delays, and that the average cost to the consignees is increased from 10 to 20 per cent. The commissioners admit that charging by weight is the correct plan, but they lay great stress on the delays complained of, and therefore sustain the shippers.

A New Lake and Rail Line.

The Toledo, St. Louis & Kansas City will this season establish a line between Toledo and Buffalo, which is expected to win a fair share of the St. Louis flour carrying away from the Wabash and the St. Louis lake and rail lines. Its fleet for the present will consist of the steamers Dean Richmond and Roanoke, but other boats will be added. J. E. Botsford is manager.

The Work of Car Service Associations.

The *Equipment Guide* for April prints the following list of 15 car service associations, enabling comparisons to be made of the results at different points:

Name of association.	Commenced work.	Cars handled first month.	Average detention per car first month.	Cars handled last month.	Average detention last month.
		Days.		Days.	
Buffalo C. S. Ass'n.....	Feb. 1, 1890..	14,415	1.96	14,415	1.96
Chicago C. S. Ass'n.....	Nov. 19, 1888	69,000	2.37	70,000	1.63
Cleveland C. S. Ass'n.....	Nov. 13, 1889	29,000	2.34	24,692	2.26
Cincinnati C. S. Bureau.	Dec. 1, 1889..	11,242	1.75	9,240	1.79
Denver Demurrage Bu.	Nov. 10, 1888	10,560	4	17,733	2.71
Detroit C. S. Ass'n.....	April 15, 1889	8,442	1.78	11,117	1.37
Dayton C. S. Ass'n.....	Dec. 9, 1889..	2,991	1.77	4,232	1.39
Erie C. S. Ass'n.....	Nov. 20, 1889	1,816	2.72	1,843	2.29
G. Rapids C. S. Ass'n.....	Jan. 1, 1890..	3,144	.99	3,724	.99
Illinois C. S. Ass'n.....	Feb. 17, 1890.	8,252	*	*	*
Indiana C. S. Ass'n.....	Jan. 1, 1890..	21,700	1.49	19,772	1.45
Mahoning & Shenango Valley Car S. Ass'n.....	Feb. 1, 1890..	32,730	1.77	32,730	1.77
Memphis C. S. Ass'n.....	Jan. 1, 1890..	*	1.64	*	1.41
St. Louis C. S. Ass'n.....	Nov. 1, 1889.	23,450	2.36	18,872	1.65
Virginia C. S. Ass'n.....	Jan. 15, 1890.	9,223	1.97	9,223	1.97
Av. detention per car				227,653	1.76

*Not reported.

The rate charged by all of the above associations is one dollar per car per day, with the exception of the Denver bureau, which charges fifty cents per car per day for the first five days, one dollar per car per day for the second five days, and two dollars per car per day for each ensuing day thereafter. The one dollar per day rate is collected for each day or fraction thereof, except by the Virginia association, which allows three days exclusive of the day of notice to the consignees of arrival. Some of the associations compute the forty-eight hour limit from the time of notice to the consignees of arrival, but the general rule is to compute the time from the time that cars are placed ready for delivery, regardless of notice to consignee. The Buffalo association has recently adopted a somewhat different rule.

The only associations which do not make an exception to the rule in favor of particular commodities are those at Denver, Memphis and St. Louis. The Buffalo association allows five days on anthracite coal. Chicago allows three days on coal when on storage tracks not accessible to consignees. Cleveland makes an exception on coal and coke. Cincinnati allows five days on fruit and vegetables, and four days on coal at Hamilton. Detroit makes an exception on coal, charcoal, bones, coke, grain and lumber, exact time not stated. Dayton allows four days on coal. Erie allows four days on coal. Grand Rapids allows five days on coal, coke, grain and lumber. Illinois allows three days on coal. Indiana makes exception on coal, coke, corn and scrap iron, time not stated. Mahoning and Shenango Valley makes exception on coal, coke, ore, limestone and cinder, time not stated. Virginia allows five days on hay.

The report presented at the Time Convention this week gives the following information supplementary to the above. Associations have been formed at Toledo, Dec. 16, 1889; Omaha, Nov. 1, 1889; Peoria, Dec. 10, 1889; Chattanooga, Nov. 25, 1889; Pittsburgh, March 31, 1890; Milwaukee, Nov. 25, 1888; St. Paul and Minneapolis, Nov. 10, 1888; Duluth, Nov. 7, 1889.

East-bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, April 5, amounted to 70,830 tons, against 91,485 tons during the preceding week, a decrease of 20,655 tons, and against 45,777 tons during the corresponding week of 1889, an increase of 25,053 tons. The proportions carried by each road were:

	W'k to Apr. 5.		W'k to Mch. 29.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central.....	8,881	12.6	12,332	13.6
Wabash.....	2,539	3.6	3,697	4.1
Lake Shore & Michigan South.	12,676	17.9	15,136	16.6
Pitts., Ft. Wayne & Chicago...	8,876	12.5	9,363	10.3
Chicago, St. Louis & Pitts....	9,715	13.7	9,533	10.8
Baltimore & Ohio.....	6,382	9.0	12,433	13.1
Chicago & Grand Trunk.....	8,662	12.2	10,532	11.9
New York, Chic. & St. Louis...	8,792	12.4	10,118	11.1
Chicago & Atlantic.....	4,307	6.1	7,711	8.5
Total.....	70,836	100.0	91,485	100.0

Of the above shipments 5,275 tons were flour, 33,944 tons grain, 2,796 tons millstuffs, 5,009 tons cured meats, 3,228 tons lard, 9,060 tons dressed beef, 1,328 tons butter, 1,273 tons hides, 257 tons wool and 5,140 tons lumber. The three Vanderbilt lines carried 42.9 per cent. of all the business, while the two Pennsylvania lines carried but 26.2 per cent.